

## Business Intelligence

### Business Environment Factors

FACTOR	DESCRIPTION
Markets	Strong competition Expanding global markets Blooming electronic markets on the Internet Innovative marketing methods Opportunities for outsourcing with IT support <u>Need for real-time, on-demand transactions</u>
Consumer demand	Desire for customization Desire for quality, diversity of products, and speed of delivery <u>Customers getting powerful and less loyal</u>
Technology	More innovations, new products, and new services Increasing obsolescence rate Increasing information overload Social networking, Web 2.0 and beyond
Societal	Growing government regulations and deregulation Workforce more diversified, older, and composed of more women Prime concerns of homeland security and terrorist attacks Increasing social responsibility of companies Greater emphasis on sustainability

### Changing Business Environment

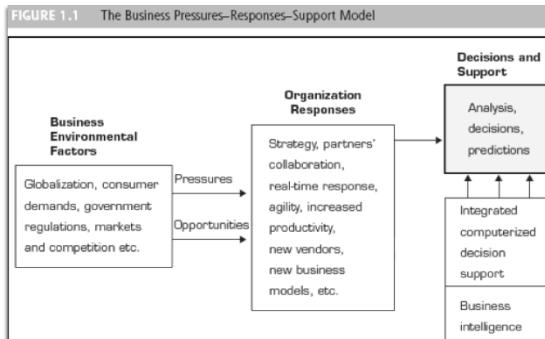
- The environment in which organizations operate today is becoming more and more complex
- The complexity creates opportunities on one hand and problems on the other.
- Business environment factors are divided into four major categories:
  - markets,
  - consumer demands,
  - technology,
  - societal
- The intensity of these factors increases with time, hence more pressures, more competition, more management problems

### Organizational Responses – managerial approach

- In handling the complexity of today's business environment, managers are expected to respond quickly and be agile
- Be Reactive, Anticipative, Adaptive, and Proactive
- Managers may take actions, such as
  - Employ strategic planning
  - Restructure business processes
  - Participate in business alliances
  - Improve corporate information systems
  - Improve partnership relationships
  - Encourage innovation and creativity ... and many more
- Many if not all of the actions , have now implemented computerized support

## Organizational Responses

Companies are moving aggressively to computerized support of their operations



## Decision Making in Business

- Management ≡ Decision Making
- Decision making means selecting the best solution from two or more alternatives
- Management was considered an art because a variety of individual styles could be used in addressing problems
- Often based on creativity, judgment, intuition, experience rather than on a scientific approach.
- Studies suggest that managers roles can be classified into 3 major categories:
  - Interpersonal – figurehead, leader
  - Informational- spokesperson, disseminator
  - Decisional- negotiator, resource allocator

## Decision Making in Business

- Making decision has become a complex tasks in management, due to :
  - IT has resulted in more and more alternatives to choose from
  - Government regulation, political climate makes it difficult to predict results
  - Need to make fast decisions, insufficient time to weigh decisions, errors may cost the business negatively
- Intuition and trial-and-error approaches to managerial decision making may not be as effective and applicable in today's business environment

## Get the computers to help!

- Today's computerized systems offer capabilities to facilitate decision support through:
  - Speedy computations
  - Improved communication and collaboration
  - Increased productivity of group members
  - Improved data management
  - Quality support
  - Agility support
  - Overcoming cognitive limits of humans
  - Ubiquity

## Structured Decision and Unstructured Decision

- Decision-making processes depends on the degree of structuredness
- Structured processes are routine and typically repetitive problems – standard solution exists. E.g. rule based solution, if only 70% of the seats on a flight from LA to NY are sold three days prior to departure, offer a discount of x % to non-business travelers.
- Unstructured processes are complex, no fixed solution – necessary to develop customized solutions. Such solutions will require intuition, judgment, communication and collaboration in manpower and technologies E.g. How to decide on

## The idea

Managers make decisions. Some decisions are bad, some are good  
Businesses can't afford to make bad decisions

**The right decision = Intelligence + Information**

**Intelligence = The capacity to acquire and apply knowledge**

**Information = is used to tell stories, to discover things, to keep track of things, to provide answer and eventually will lead to innovation**

**Business Intelligence =**

**The right information + The right time + From the Right Resources**

**Using information effectively to make better decisions**

**(Gautner, 1989)**

## What is Business Intelligence?

- Business Intelligence (BI) refers to computer-based techniques used in spotting, digging-out, and analyzing business data, such as sales revenue by products and/or departments or associated costs and incomes

(Wikipedia,2010)

- Business Intelligence (BI) helps business people make more informed decisions by providing them timely, data-driven answers to their business questions. BI analyzes data stored in data warehouses, operational databases, and/or ERP systems (i.e. SAP®, Oracle, JD Edwards, Peoplesoft) and transforms it into attractive and easy to understand dashboards and reports. BI delivers the insight needed to make strategic planning decisions, improve operational efficiencies, and optimize business processes.

(Microstrategy.com)

## A What is Business Intelligence?

- An umbrella term that combines architectures, tools, databases, applications and methodologies in order to enable interactive access to data, to enable manipulation of data and to give business managers the ability to make more informed and better business decisions

(Turban, 2010)

- Business intelligence uses knowledge management, data warehouse[ing], data mining and business analysis to identify, track and improve key processes and data, as well as identify and monitor trends in corporate, competitor and market performance."

(bettermanagement.com)

**In your very own term?**

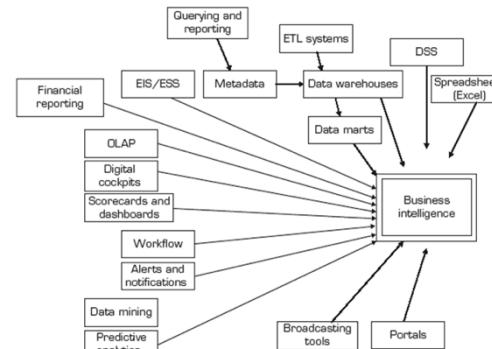
## **Business Intelligence main objectives**

- Enable interactive access to data (sometimes in real time)
- Enable manipulation of data to allow appropriate analysis by managers
- Provide valuable insights to produce informed and better decisions
- The process of BI is based on transformation of data to information, then to decisions and finally to actions
- Facilitate closing the strategy gap of an organization

## **A History of Business Intelligence**

- It was coined in a 1958 article by an IBM researcher Hans Peter. He defined business intelligence as: "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal."
- 1970s saw the implementation of MIS reporting system – static, two dimensional and no analytical capabilities
- 1980s saw the emergence of EIS – computerized support to top-level managers, ad hoc or on demand reporting system, prediction, trend analysis
- Howard Dresner proposed that BI was in fact an umbrella term that described the "concepts and methods to improve business decision making by using fact-based support systems", this was back in 1989.
- Until mid 1990s, the same capabilities and some new ones appear under the name Business Intelligence (the original concept of EIS was transformed into BI)

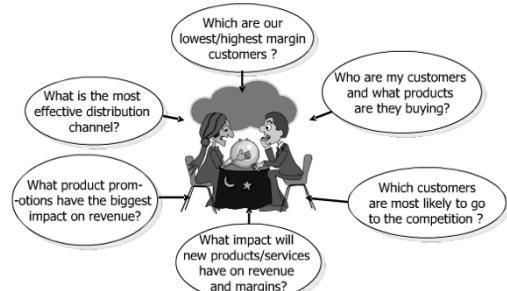
## **Various tools and techniques in BI**



Most sophisticated BI products include most of the above

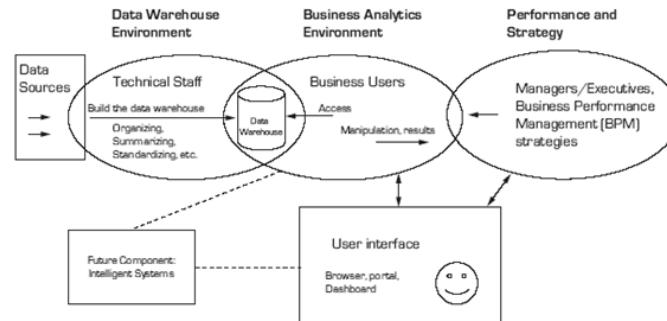
## Decision Making in Business

A producer wants to know....



Will require information

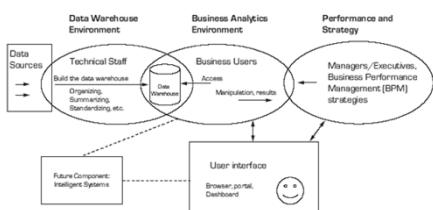
## The architecture of Business Intelligence



A Business Intelligence system has **four major components**

## 4 major components of Business Intelligence architecture

1. The data warehouse is a special database or repository of data that had been prepared to support decision making applications ranging from simple reporting to complex optimization



## 4 major components of Business Intelligence architecture

2. Business analytics are the software tools that allow users to create on-demand reports, queries and conduct analysis of data. Originally they appear under the name online analytical processing (OLAP)  
Data Mining - A class of information analysis based on databases that looks for hidden patterns in a collection of data which can be used to predict future behavior  
e.g. Amazon.com uses data mining to predict the behaviour of their customers
- Automated Decision Systems - Rule-based system that provide solution usually in one functional area to a specific repetitive managerial problems

## 4 major components of Business Intelligence architecture

3. Business performance management (BPM) based on balanced scorecard methodology – a framework for defining, implementing, and managing an enterprise's business strategy by linking objectives with factual measures

Objective is to optimize overall performance of an organization. A real-time system that alert managers to potential opportunities, impending problems, and threats, and then empowers them to react through models and collaboration

## The architecture of Business Intelligence

4. User interface allows access and easy manipulation of other BI components

Tools used to broadcast information

Data visualization provides graphical, animation, or video presentation of data and the results of data analysis  
The ability to quickly identify important trends in corporate and market data can provide competitive advantage

The screenshot shows a web-based analytical tool for terrorism data. At the top, there's a navigation bar with links like HOME, ABOUT TKB, ANALYTICAL TOOLS, METHODOLOGIES, DOWNLOADS, LINKS, FAQ, and FEEDBACK. Below the navigation is a search bar with a dropdown menu for 'analytical tools'. To the right of the search bar is a 'SEARCH' button. Underneath the search bar, there's a section titled 'terrorism in the news' with a list of recent news items. On the left side, there are several boxes representing different analytical features: 'Incident Analysis Wizard' (with a grid icon), 'graph tool' (with a graph icon), 'Incident Statistics by Region' (with a bar chart icon), 'Incident Reports' (with a document icon), 'Group Comparison Report' (with a bar chart icon), 'Group Reports by Region' (with a bar chart icon), 'Indictment Dataset' (with a bar chart icon), 'Count Outcome Statistics' (with a bar chart icon), 'Overall Case Results' (with a bar chart icon), and 'legal reports' (with a document icon). At the bottom of the page, there's a URL: <http://dashboardspy.com/img/terrorism-dashboard.jpg>.

The screenshot shows a complex retail store dashboard for 'Crazy Bikes'. It includes various data visualizations and links. At the top, there's a header with the date 'Tuesday, April 25, 2006'. Below the header, there are two tables: 'Orders Shipping Today' and 'Top Customers This Month'. The 'Orders Shipping Today' table shows orders for A/B Cycle Shoppe, Bernard's Schwinn Cydery, and House of Bikes. The 'Top Customers This Month' table shows sales for A/B Cycle Shoppe, The Spokesman, Inc., and Town & Country Cycles. In the center, there's a pie chart titled 'Sales by Product Class' showing the distribution of sales between Apparel (13%), Equipment (0%), and Bikes (72%). To the left, there's a 'Shop floor calendar' and a 'mrc demo help' link. To the right, there's a weather forecast for Honolulu, HI, a link to 'MacNewsWorld', and a 'Download Desktop Weather' link. The URL at the bottom is <http://dashboardspy.com/img/retail-store-dashboard.gif>.

## Relation between BI and DSS

Their architectures are very similar because BI evolved from DSS

DSS directly support specific decision making, while BI provides accurate and timely information, and indirectly support decision making

BI has an executive and strategy orientation, especially in its BPM and dashboard components, while DSS, in contrast, is oriented toward analysts

## Relation between BI and DSS

Most BI systems are constructed with commercially available tools and components, while DSS is often built from scratch

DSS methodologies and even some tools were developed mostly in the academic world, while BI methodologies and tools were developed mostly by software companies

Many of the tools that BI uses are also considered DSS tools (e.g., data mining and predictive analysis are core tools in both)

BI is a result of a continuous revolution and, as such, DSS is one of BI's original elements

## Review Questions

1. Explain the term BI
2. Describe the emergence of BI
3. Identify and briefly describe the major components of BI
4. Discuss 3 reasons why making business decisions today has become a complex task
5. Today's computerized systems offer capabilities to facilitate decision support through ubiquity. Explain this notion.

## Now ask if ..

You are able to:

- Critically discuss problems faced by today's business and ways they are being addressed
- Discuss the need for computerized support of managerial decision making
- Explain the concept of Business Intelligence
- Describe the business intelligence (BI) components and relate them to DSS

## A The benefits of BI

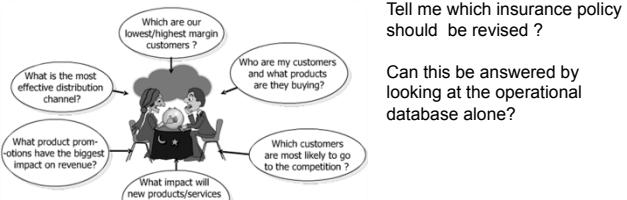
### The Benefits of BI

- Time savings
- Single version of truth
- Improved strategies and plans
- Improved tactical decisions
- More efficient processes
- Cost savings
- Faster, more accurate reporting
- Improved decision making
- Improved customer service
- Increased revenue



## How to measure the value of BI?

- The methodologies of assessing BI values are complex
- Difficult to measure success due to many intangible benefits
- One way to present the business value of BI is to pose business questions and show how they are answered with the support of BI



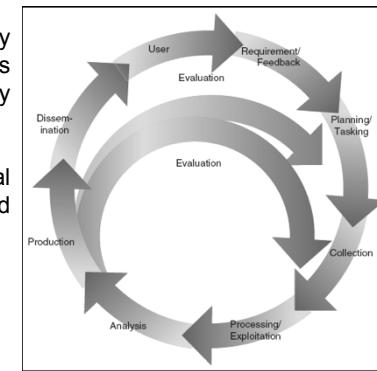
## The business values of BI

- Key Issues and Framework for BI Analysis
  - How can enterprises maximize their BI investments?
  - What BI functionality do enterprises need, and what are they using today?
  - What are some of the hidden costs associated with BI initiatives?

## Intelligence Creation and Use

BI initiatives typically follow a similar process to that used in military intelligence

The process is cyclical with series of interrelated steps



## BI Governance

**Governance** refers to defining and implementing an infrastructure and strategy that will support the enterprise goals.

**BI governance** is the process of prioritizing BI applications on the basis of costs and benefits. It builds in flexibility by creating robust processes capable of scaling to any size and scope, and all aspects related to the approach of BI efforts are clearly defined. Along with a mechanism to manage your BI strategy, BI governance provides measurements for gauging success.

## BI Governance

BI Governance can be defined from three different, unique perspectives:

- As a resource rationalization exercise. This is the traditional definition of BI Governance, a **prioritization mechanism** by which projects can be approved, rejected and sequenced based on specific criteria. Many companies today have some kind of process to prioritize BI requests; however most of them still rely on subjective factors to determine what is most important and what is not.



Source : <http://businessintelligence.com>

## BI Governance

BI Governance can be defined from three different, unique perspectives:

- As a series of **guidelines/rules/recommendations**. This is a relatively new way of defining BI Governance. Traditionally IT has been solely responsible for defining the Architecture, Standards and Best Practices to follow in Business Intelligence, however as business starts realizing the significant impact that these decisions may have in BI Projects, they are beginning to make these topics part of the BI Governance process.



Source : <http://businessintelligence.com>

## BI Governance

BI Governance can be defined from three different, unique perspectives:

- As the **definition of roles and responsibilities** for both IT and Business stakeholders. As Business Intelligence projects are by nature highly complex, establishing the proper interaction and outlining areas of responsibility between and IT and the Business becomes critical for a project to succeed.



Source : <http://businessintelligence.com>

## The Major Theory of Business Intelligence

- BI is not transaction processing
- Hence OLTP vs. OLAP
  - online transaction processing systems (OLTP)
    - Systems that handle a company's routine ongoing business
    - Online transaction processing is the use of information systems to handle a company's routine, on-going business activities through recording data about events that take place in the course of business operations as they occur and using that data in other business operations.
    - Based on structured decision making

## The Major Theory of Business Intelligence

### online analytic processing (OLAP)

- An information system that enables the user, while at a PC, to query the system, conduct an analysis, and so on.
- Online analytical processing is the use of information systems to analyze, with human guidance, historical data obtained through ongoing business activities and other sources to use as a basis for decision making.
- Based on unstructured decision making

## OLAP vs. OLTP

- Compare and contrast

## The Major Theory of Business Intelligence

	Strategic Imperative	Competitive Intelligence	Competitive Advantage
Definition			

## Toward Competitive Intelligence and Advantage

- BI is a Strategic Imperative

- A **strategic imperative** is an action that must be taken, or a capability that must exist, if an organization is to survive and prosper. It is not optional.
- BI is a strategic imperative because it enables managers to make better decisions than they could without it. If some firms in an industry or market are making better decisions and the rest are not, those that do not make better decisions will fail.
- Companies today must change or advance strategy in order to stay one step ahead of increasing competitive advantages.

## Toward Competitive Intelligence and Advantage

- Achieving Competitive Advantage through Competitive Intelligence (CI)

- **Knowledge is power**
- **Competitive intelligence** is the process of obtaining as much information as is legally and ethically possible about one's competitors, their plans and their products; then organizing and analyzing it to provide a basis for management decision making.
- CI implies tracking what competitors are doing by gathering material on their recent and in-process activities

## Toward Competitive Intelligence and Advantage

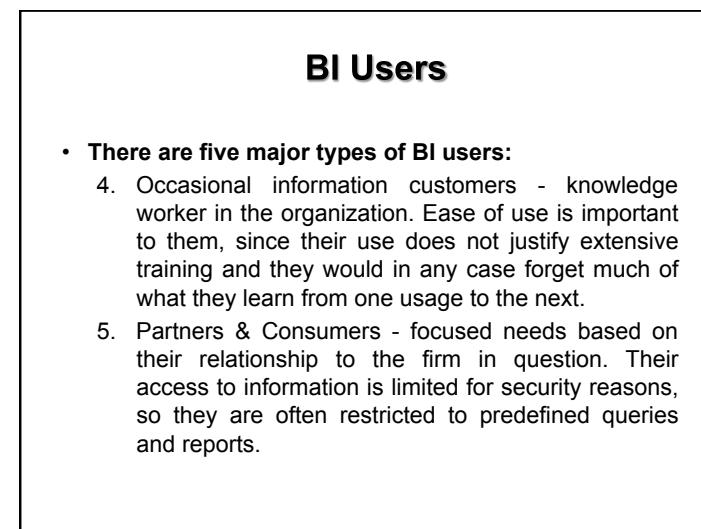
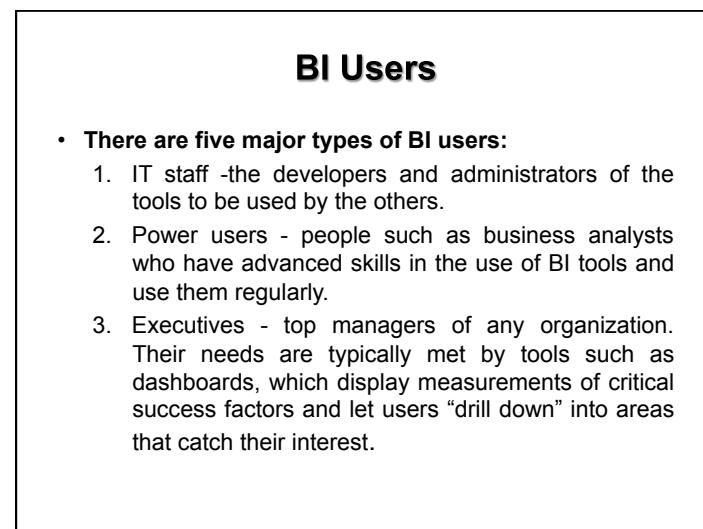
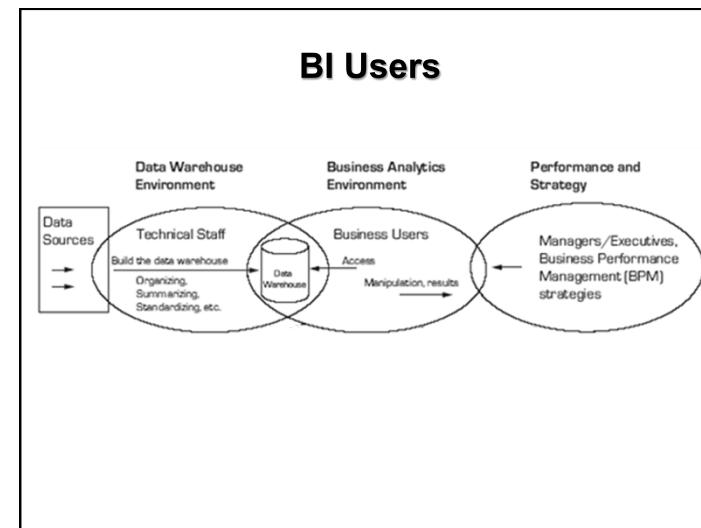
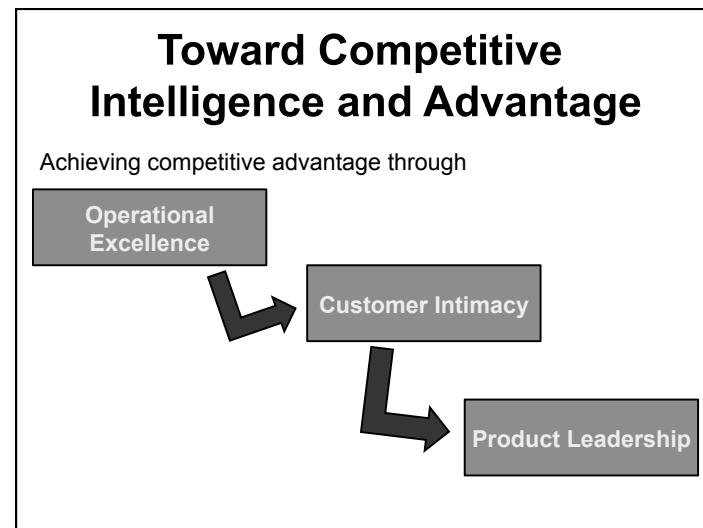
How can BI provide a competitive advantage in an industry?

- A competitive advantage is anything that enables a firm to obtain a higher level of profitability than is typical for its industry.
  - Can arise from an organization's possession of unique resources or competencies (Competencies can include such things as ability to innovate, quality, customer responsiveness, and more. Many such competencies can be enhanced via information provided by BI)
  - Through building brand and customer loyalty using BI applications

## Toward Competitive Intelligence and Advantage

How can BI help in sustaining competitive advantage?.

- Competitive advantage is often temporary. For example, if it is based on innovation, other firms can copy the innovation.
- A sustainable competitive advantage must be based on something that cannot be copied directly, such as a capability to innovate repeatedly and thus to stay ahead of the competition even if each individual innovation is copied.
- Business intelligence can provide managers with the information they need to sustain a competitive advantage, the specifics of how they do this will vary from one type of competitive advantage to another. (also *the type of manager*)



## Major Issues in implementing BI

- Understanding and dealing with the user community. The BI team must appreciate the different classes of potential BI users.
- Planning and alignment with business strategy. BI is not just a technical exercise for the IS department.
- Organizational culture, which determines how enthusiasm for BI use can be built.
- Integration of multiple BI projects: with each other, with other organizational IS and with the IS partners.

## Review Questions

1. Explain the term 'strategy gap' from BI's perspectives
3. Identify the steps of intelligence creation and use.
4. Explain the term BI governance
5. Compare and contrast OLTP and OLAP
6. Explain how can BI provide a competitive advantage in an industry?

## Now ask if ..

You are able to:

- Discuss intelligence creation and use of BI
- Explain BI governance
- Describe the major types of BI users
- Describe major issues in implementing BI