BAIT3013
Business Intelligence

Lecture 1

INTRODUCTION TO BUSINESS INTELLIGENCE (BI)

Data, Information and Knowledge

- Data is number that do not have any meaning
  - 1,4,7
- Information
  - Data is represented in more meaning
  - 1kg, 7 inch
- Knowledge
  - More presented
  - If today is raining, I will not go out

History of BI

- The emergence of decision support
  - Management Information Systems1970s
    - Earlier on
    - Reporting system had no analytical capabilities

Decision support system

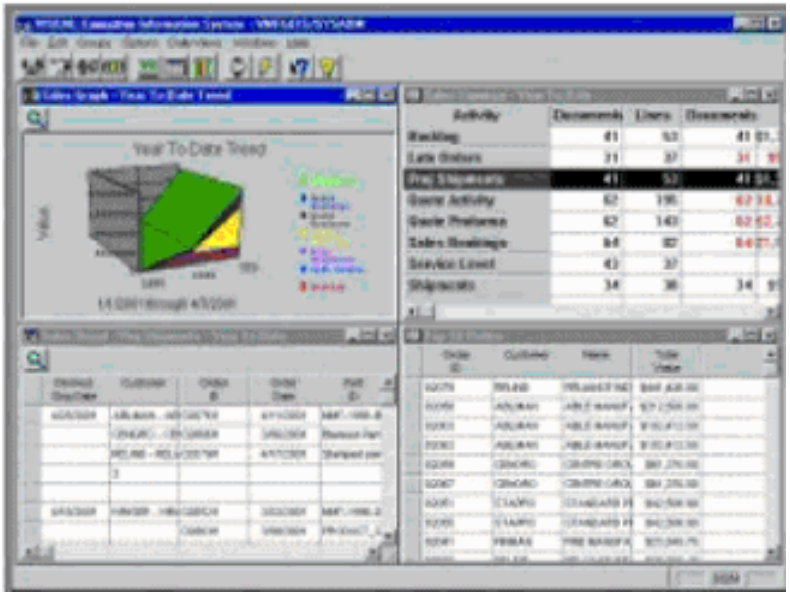
- A conceptual framework for a process of supporting managerial decision- making, usually by modeling problems and employing quantitative models for solution analysis

Why use DSS ?

- Competition has increased
- Existing systems do not support decision support
- Accurate information is needed
- Improved customer and employee satisfaction

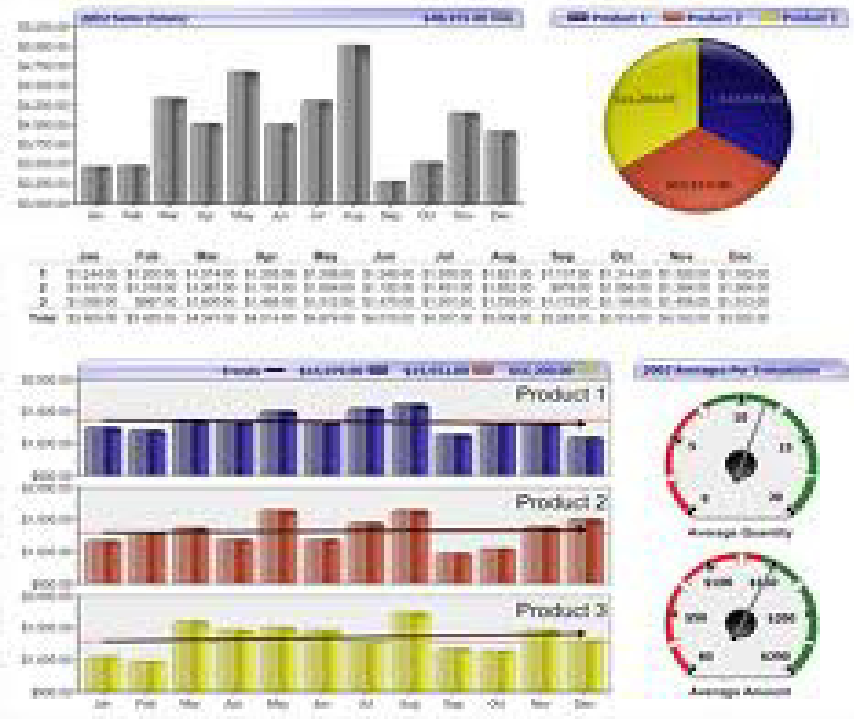
History of BI

- Executive information system (EIS)
  - Begin 1980s
  - Ability to drill down



History of BI

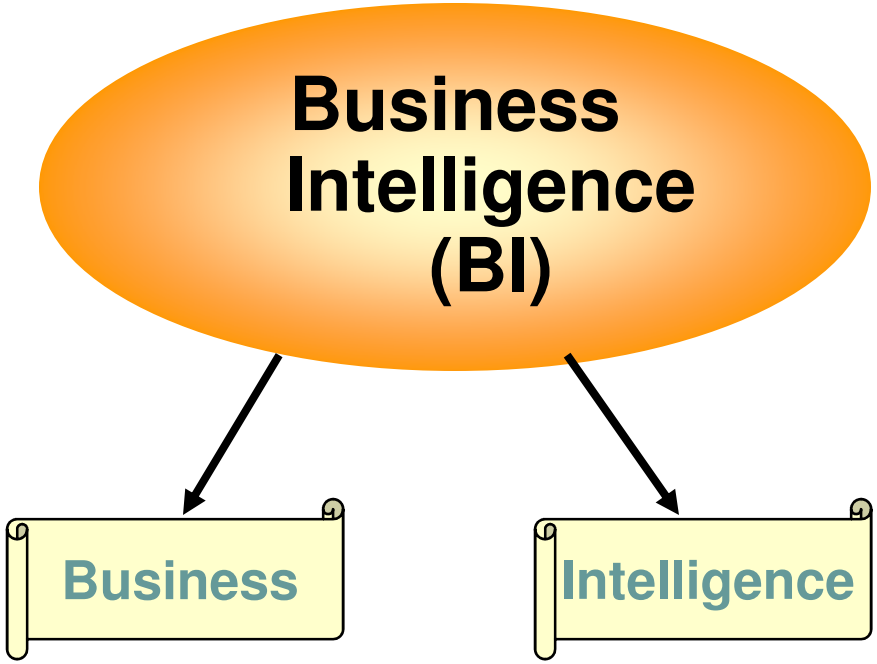
- Business Intelligence
  - Introduced by Howard Dresner , 1989.



History of BI

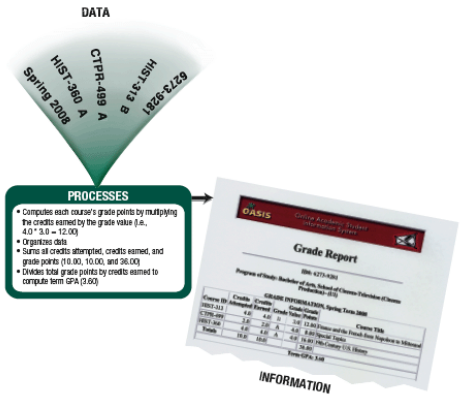
Organization level	Types of systems	Information inputs	Information Outputs	Users	Applications
Strategic level systems	Executive support systems	Aggregate data	Projections; response to queries	Senior managers	Forecasting, profit planning, etc.
Management level systems	Decision Support Systems	Low volume of data or massive databases optimized for data analysis; analytic models and data analysis tools.	Special reports; decision analysis, responses to queries.	Professional; staff managers	Sales region analysis, production scheduling, cost analysis, etc.
	Management Information Systems	Summary transaction data; high volume data; simple models	Summary and exception reports	Middle managers	Sales management, annual budgeting.

What is Business Intelligence ?



What is Business Intelligence ?

- A set of methodologies transform raw data -> information
  - right time, right location and right form, to assists individual, department, division or enterprise facilitate improved decision making.



Definition of BI

Author(Year)	Definition
Ceng et al. (2020)	Process whereby a firm can scan and absorb information from environment to detect an available opportunity while minimizing the threats associated with uncertainty
Shahbani and Azman (2020)	Process of collecting, analyzing, and transforming data using Data Warehouse (DW)
Olivera et al. (2020)	Tool that extracts, transforms, and enables data to be crossed to assist managers in making decisions

Definition of BI

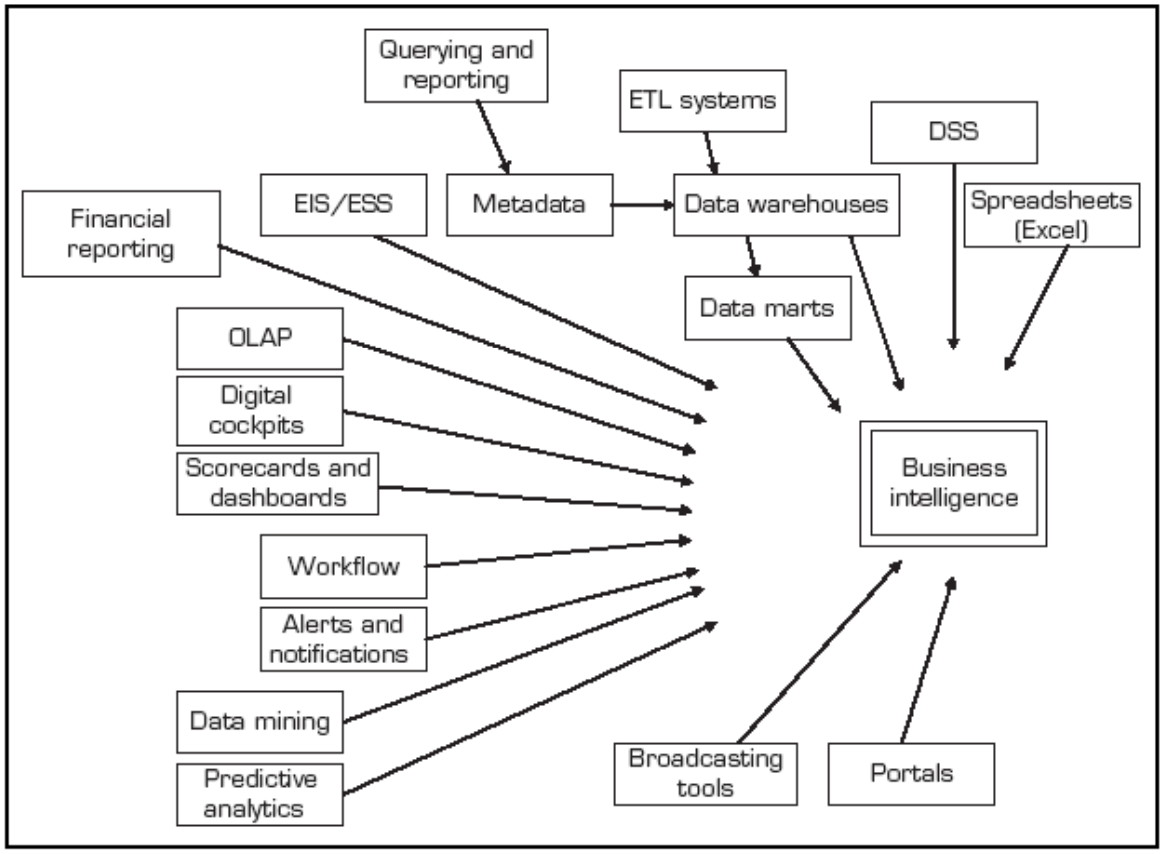
Author(Year)	Definition
Sameer and Chavan (2020)	Access raw data to process it into purposeful information for the organization to take business benefits from the data. access raw data to process it into purposeful information for the organization to take business benefits from the data.
Ramesh et.al (2020)	Tools that convert the required raw data into meaningful information which may aid in supporting the decision-making process of the management.
Admad et.al (2020)	Combination of technical tools and techniques that provide historical information to its users for analysis, query, and reporting that support management and significant decision-making for enhancing the efficiency of business processes.

A Framework for Business Intelligence (BI)

- An umbrella term that combines architectures, tools, databases, applications, and methodologies.
- BI is the discipline that combines services, applications, and technologies to gather, manage, and analyze data, transforming it into usable information to develop the insight and understanding needed to make informed decisions

A Framework for Business Intelligence (BI)

FIGURE 1.6 Evolution of BI



A Framework for Business Intelligence (BI)

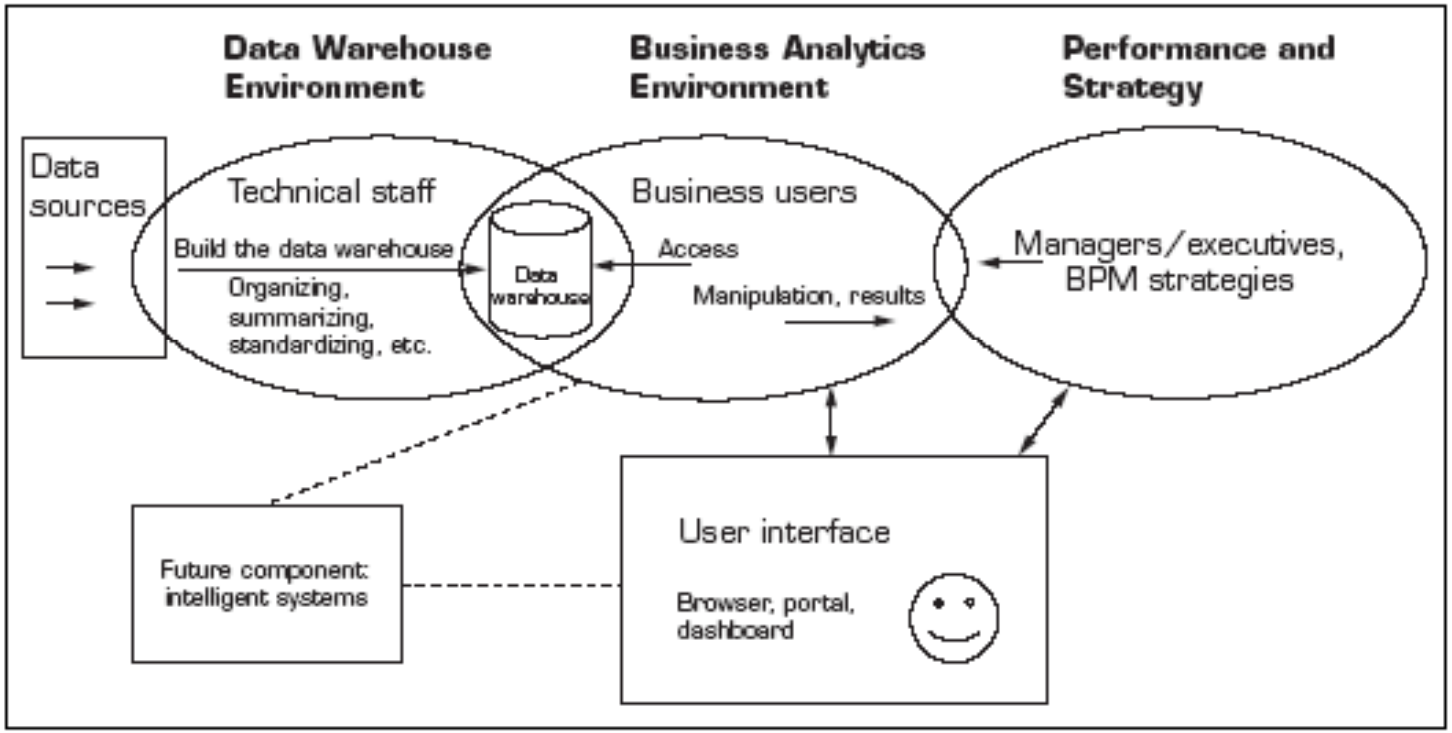


FIGURE 1.7 A High-Level Architecture of BI

A Framework for Business Intelligence (BI)

- BI architecture
  - Data warehouse
  - Business analytics
  - Performance management (BPM)

A Framework for Business Intelligence (BI)

- Data warehouse
  - Originally, included historical data that were organized and summarize, so end users could easily view or manipulate data and information.
  - Today, some data warehouses include current data as well, so they can provide real time decision support

A Framework for Business Intelligence (BI)

- Business analytics
  - Reporting and queries
  - Advanced analytics
  - Data, text and Web mining and other sophisticated mathematical and statistical tools

A Framework for Business Intelligence (BI)

- Data mining
  - A process of searching for unknown relationships or information in large databases or data warehouses, using intelligent tools such as *neural computing*, predictive analytics techniques, or advanced statistical methods

A Framework for Business Intelligence (BI)

- Business performance management (BPM)
  - An advanced performance measurement and analysis approach that embraces planning and strategy
    - BPM extends the monitoring, measuring, and comparing of sales, profit, cost, profitability, and other performance indicators by introducing the concept of “management and feedback
    - BPM provides a top-down enforcement of corporate-wide strategy

A Framework for Business Intelligence (BI)

- Business performance management
  - User interface
  - Dashboard

    A visual presentation of critical data for executives to view. It allows executives to see hot spots in seconds and explore the situation
  - Dashboards integrate information from multiple business areas
    - Visualization tools

A Framework for Business Intelligence (BI)

- Styles of BI
  - Report Delivery and Alerting
  - Enterprise Reporting (dashboard, scorecard)
  - Cube Analysis (Slice and Dice Analysis)
  - Ad-hoc Query
  - Statistics and Data Mining

Types of BI's users

Source: *Adopted from Gartner Research (2004); Imhoff and Pettit 2004; Turban et al. (2007)*

Types of Users	*IT Staff*	*Power Users*	*Executives*	*Functional Managers*	*Occasional Information Customers*	*Extranet: Partners, Consumers*
Number of Users	Few	Dozens	Dozens	Dozens to hundreds	Hundreds to thousands	Hundreds to thousands
BI Tools and Functions	Developer Admin Metadata Security Data Management Applications Integration	Ad hoc query OLAP Reports Data mining Advanced analysis	Dashboard Scorecard Reports CPM (corporate performance management) BPM	Reports Spreadsheet OLAP view BAM (business activity monitoring) CPM	Reports Spreadsheet Queries	Reports Tracking
Strategic Value	Low	High	Very High	Medium	Low	High

Business Intelligence (BI)

- Benefits of BI
  - Faster, more accurate reporting
  - Improved decision making
  - Improved customer service
  - Increased revenue

Business Intelligence (BI)

- The DSS-BI connection
  - The architecture is very similar since BI evolved from DSS
  - DSS are constructed to *directly* support specific decision making; BI systems are geared to provide accurate and timely information (*indirect support)*
  - BI has an executive and strategy orientation while DSS has been oriented toward analysts

Business Intelligence (BI)

- The DSS-BI connection
  - BI systems are constructed with commercially available tools and components that are fitted to the needs of organizations; DSS more programming is used to construct custom solutions to very unstructured problems
  - DSS were developed mostly in the academic world; BI were developed mostly by software companies
  - Many tools used by BI are also considered DSS tools (e.g., data mining and predictive analysis)

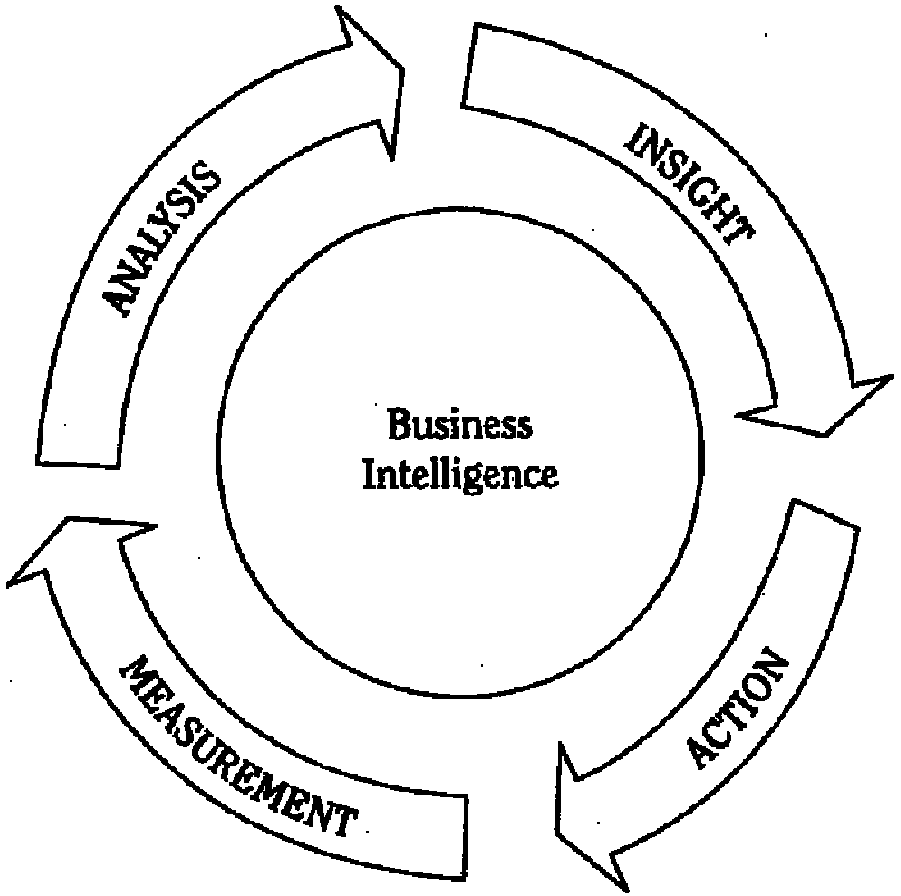
Difference between BI and conventional system

Attributes	Transactional system	BI system
Business purpose	Support the operational business activities in an efficient manner	Support strategic and tactical activities by giving the right information and new insights to the business.
Functions	Day to day operations	Long terms decision supports
User type	Frontline workers	Knowledge workers, managerial staffs

Difference between BI and conventional system

Attributes	Transactional system	BI system
Orientation	Transaction	Analysis
Number of users	Large numbers	Relatively small
Data contents	Current values	Archived, summarized, derived

BI cycle


ANALYSIS
INSIGHT
Business
Intelligence
MEASUREMENT
ACTION

BI cycle : Analysis

- Determine what data to collect and what analysis to perform by selecting and filtering what is important based on self understanding and assumptions of how the business operates

- E.g. what is important to our customers, suppliers, and employees; what factors affect product cost and quality; and what happens if we raise the selling price.

BI cycle : Insight

- Insight is the product of broad, free-ranging analysis born of questions that only we human beings can ask—the discovery of patterns that only humans can recognize as useful.
- Operational insights – e.g. discovering the cause of price variances in a commodity purchase
- Strategic insights – e.g. alternative ways to get more customers

BI cycle : Action

- The connection to action in the BI cycle is through the decision-making process.
- Action needs backing of strong analysis and business intelligence to produce clearer purposes and details, and to gather stronger organizational support for its implementation
- BI-based decision making with faster turnaround and tighter feedback loops provides more opportunity for action-oriented experiments and testing

BI cycle : Measurement

- Business intelligence allows the setting of standards and benchmarks for monitoring performance and providing feedback in every functional area of the business, using metrics that extend beyond traditional financial measures

- Key performance indicators (KPIs), i.e. metrics, ratios, activity drivers, that managers need to understand, analyze, and take action against on a frequent basis are results from comprehensive BI systems

Application of BI

- Retail

Retail

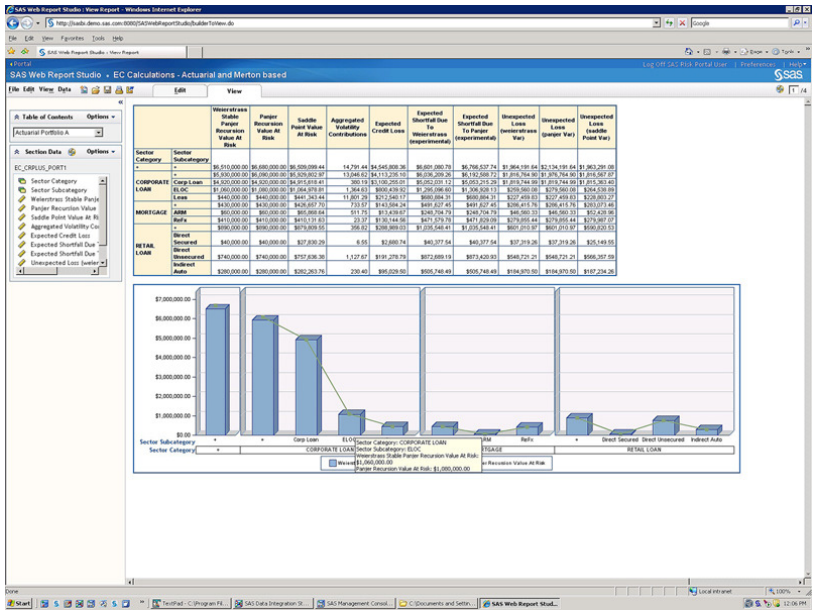
- Senheng implemented enterprise data warehouse using Microstrategy software to store transaction data collected from all outlets and transform it into information such as sales, inventory, customer, and finance.
- The implementation of BI system helps Senheng to improve stock turnover by optimizing cash flow and to react quickly to business issues pertaining to customers and outlets.

Application of BI

- Banking, finance and securities

Banking

- CIMB Bank successfully used SAS Credit Scoring for both credit application scorecard development and the retail loan market.



Application of BI

- Education

Education

- University Utara Malaysia (UUM) uses BI to enhance performance of administration and operations, such as staff performance and business unit.

Application of BI

- Government

Government

- Inland Revenue Board (IRB) uses SAS Business Intelligence to analyze tax collections faster and understand the revenue impact of proposed tax changes.

Application of BI

- Healthcare

Healthcare

- Selayang Hospital uses Speedminer to analyze the number of patient per month, per year, revenue.

Application of BI

- Telecommunications

Telecommunications

- Digi uses Teradata's data warehousing solution.
- Allows the company to analyze customer data related to call detail records and communications management.

Application of BI

- Manufacturing industry

Manufacturing industry

- Toyota uses Hyperion's dashboard
- Allows executives to visually see hot spots in their business units
- Business manager can see in real-time such as when delivery times are slowing and can immediately find the sources of the problems

References

- Turban. E, J.E. Aronson, Ting-Peng Liang and Ramesh Sharda. (2011), *Decision Support and Business Intelligence Systems*, 9th Ed., Prentice-Hall.

- Turban, Sharda, Delen and King (2011), *Business Intelligence, A managerial approach,* Second Edition, Prentice Hall.