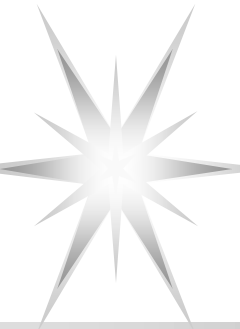




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# Business Intelligence and Analytics

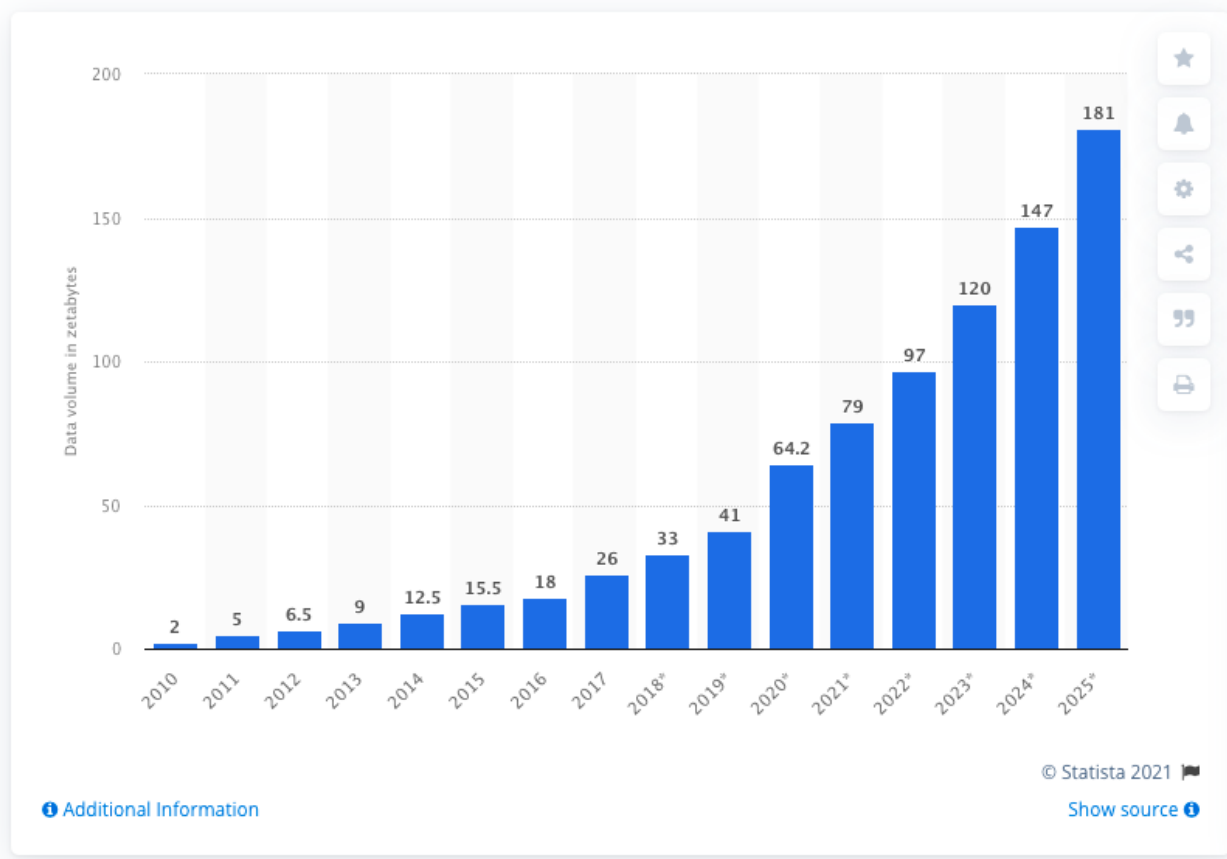
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# Why Learn about Business Intelligence (BI) and Analytics?

We are living in the age of big data, with new data flooding us from all directions at the very high speed.





# Why Learn about Business Intelligence (BI) and Analytics?

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Organizations are learning to analyze large amounts of data not only to measure past and current performance but also to make predictions about the future to improve business strategies, strengthen business operations, and enrich decision making.



# Why Learn about Business Intelligence (BI) and Analytics?

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- Human resources managers use analytics to evaluate job candidates and choose those most likely to be successful.
- Financial services teams use BI and analytics to better understand their customers to enhance service, create new and more appealing products, and better manage risk.



# Why Learn about Business Intelligence (BI) and Analytics?

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- ❑ Marketing managers analyze data related to the Web-surfing habits, past purchases, and even social media activity of existing and potential customers to create highly effective marketing programs.
- ❑ Regardless of your field of study in school and your future career, using BI and analytics, will likely be a significant component of your job.



# What Are Business Intelligence (BI) and Analytics?







# Business Analytics

- ❑ **Business Analytics** is the extensive use of data and quantitative analysis to support fact-based decision making within organizations.





# Business Analytics

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- Business Analytics can be used to:
  - gain a better understanding of current business performance,
  - reveal new business patterns and relationships,
  - explain why certain results occurred,
  - optimize current operations,
  - and forecast future business results.





# Business Intelligence

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- ❑ **Business Intelligence (BI)** refers to a wide range of applications, practices, and technologies for the extraction, transformation, integration, visualization, analysis, interpretation, and presentation of data to support improved decision making.



# Business Intelligence

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- The data used in BI is often pulled from multiple sources and may come from sources internal or external to the organization.
- Many organizations use this data to build large collections of data (warehouses and data lakes) for use in BI applications.



# Business Intelligence

- The goal of BI is to get the most value out of information and present the results of analysis in an easy to understand manner.



# Benefits Achieved from BI and Analytics

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BI and Analytics are used to achieve a number of benefits as illustrated by the following examples:

- ❑ Detect fraud
- ❑ Improve forecasting
- ❑ Increase Sales
- ❑ Optimize operations
- ❑ Reduce costs



# Benefits Achieved from BI and Analytics

## Case Study: MetLife

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- ❑ MetLife implemented analytical software to help its special investigations unit (SIU) identify medical provider, attorney, and repair shop fraud.
- ❑ Although an accident claim may not have enough data to be flagged as suspicious when it is first filed, as more claim data is added, a claim is continually rescored by the software.



# Benefits Achieved from BI and Analytics

## Case Study: Kroger

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- ❑ Kroger, an American retail company that operates 2,422 supermarkets and 1,950 in-store pharmacies.
- ❑ Kroger developed a sophisticated inventory management system that could provide employees with a visualization of inventory levels.





# Benefits Achieved from BI and Analytics

## Case Study: Kroger

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- Out-of-stock prescriptions have been reduced by 1.5 million per year, with a resulting increase in sales of \$80 million per year.
- In addition, by carrying the right drugs in the right quantities, Kroger was able to reduce its overall inventory costs by \$120 million per year.



# Components Required for Effective BI and Analytics

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- ❑ Data governance is the core component of data management; it defines the roles, responsibilities, and processes for ensuring that data can be trusted and used by the entire organization.
- ❑ Creative data scientists.
- ❑ The management team within an organization must have a strong commitment to data-driven decision making.



# Data Scientists

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- ❑ **Data science** is using data to answer questions. It is the science of analyzing raw data using statistics and machine learning techniques with the purpose of drawing conclusions about that information.
- ❑ Nowadays, the growth of data science has been increased.
- ❑ Businesses and organizations are rushing to hire **data scientists**.



# Data Scientists





# Data Scientists

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- ❑ **Data scientists** are people who understand the business as well as the business analytics technology, while also recognizing the limitations of their data, tools, and techniques.
- ❑ They are responsible for collecting, analyzing and interpreting extremely large amounts of data to deliver real improvements in organizational decision making.



# The Role of Data Scientists

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- ❑ View a situation from many angles
- ❑ Determine what data and tools can help further an understanding of the situation
- ❑ Apply the appropriate data and tools
- ❑ Work with business managers and specialists highly knowledgeable about the company's competitors, markets, products, and services.





# The Educational Requirements For Being a Data Scientist

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- ❑ Most data scientist positions require an advanced degree, such as a master's degree or a doctorate.
- ❑ Required a mastery of statistics, math, and computer programming.
- ❑ Most data scientists have computer programming skills and are familiar with languages and tools used to process big data, such as Hadoop, Hive, SQL, Python, R, and Java.



# The Educational Requirements For Being a Data Scientist

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- ❑ Many schools also offer career-focused courses, degrees, and certificates in analytical-related disciplines such as database management, predictive analytics, BI, big data analysis, and data mining.
- ❑ Such courses provide a great way for current business and information systems professionals to learn data scientist skills.



# A Shortage of Data Scientists

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- The job outlook for data scientists is extremely bright.
- The McKinsey Global Institute (the business and economics research) predicts that by 2018 the United States may face a shortage of 140,000 to 190,000 data scientists.



# A Shortage of Data Scientists

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- The recruitment agency Glassdoor pegs the average salary for a data scientist at \$118,709, and highly talented, educated, and experienced data scientists can earn well over \$250,000 per year.



# Business Intelligence and Analytics Tools

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- ❑ Spreadsheets
- ❑ Reporting and Querying Tools
- ❑ Data Visualization Tools
  - ❑ Present data in graphical formats.
  - ❑ E.g. Word cloud, Conversion Funnel
- ❑ Online Analytical Processing (OLAP)
- ❑ Data Mining



# Spreadsheets

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- ❑ Business managers often import data into a spreadsheet program, such as Excel, which then can be used to perform operations on the data based on formulas created by the end user.
- ❑ Spreadsheets are also used to create reports and graphs based on that data.







# Reporting and Querying Tools

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- ❑ Most organizations have invested in some reporting tools to help their employees get the data they need to solve a problem or identify an opportunity.
- ❑ Reporting and querying tools can present that data in an easy-to-understand fashion—via formatted data, graphs, and charts.

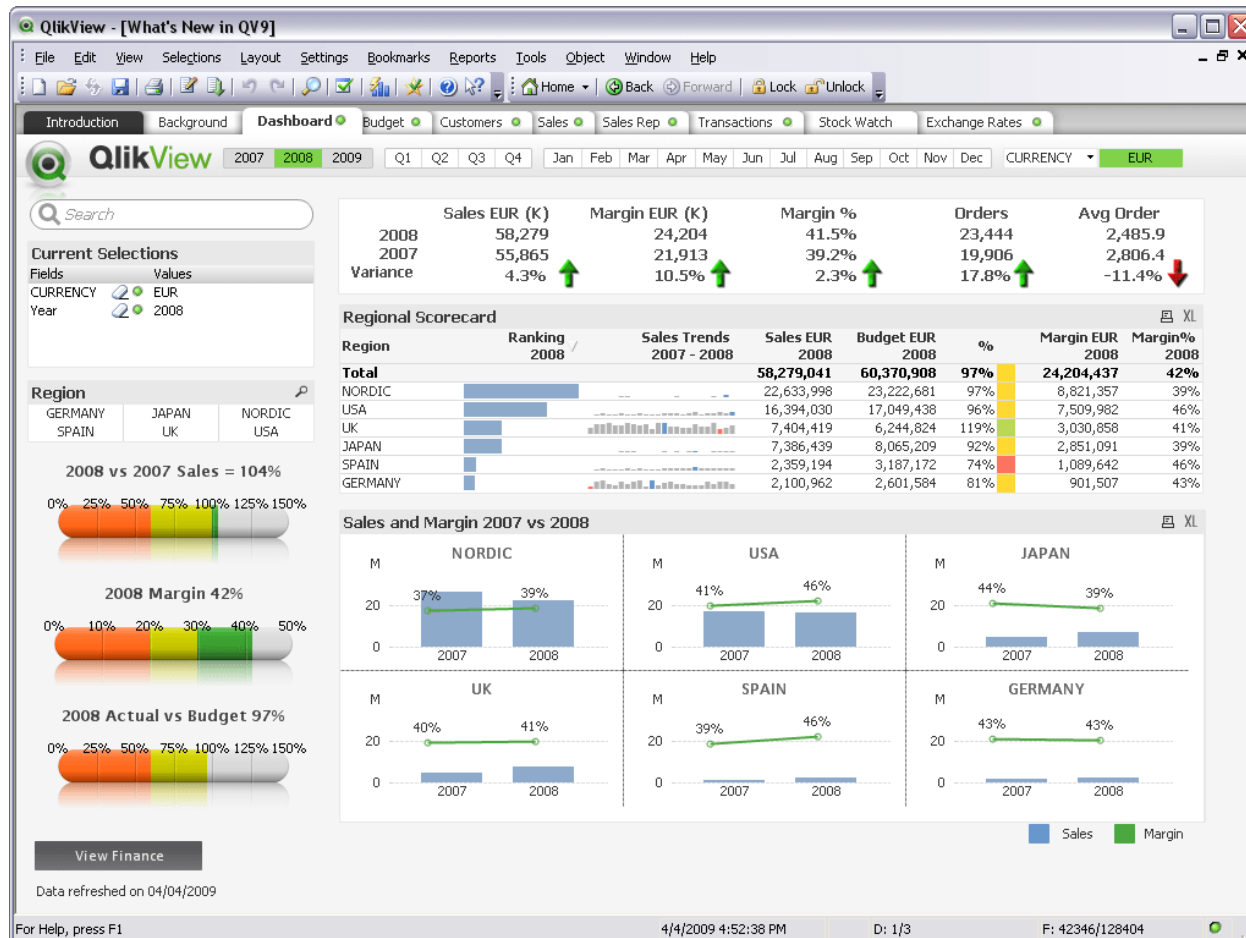


# Reporting and Querying Tools

- Many of the reporting and querying tools enable end users to make their own data requests and format the results without the need for additional help from the IT organization.



# Reporting and Querying Tools





# Data Visualization Tools

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- ❑ Many companies now troll Facebook, Google Plus+, LinkedIn, Pinterest, Tumblr, Twitter, and other social media feeds to monitor any mention of their company or product.
- ❑ Data visualization tools can take that raw data and immediately provide a rich visual that reveals precisely who is talking about the product and what they are saying.



# Data Visualization Tools

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- ▣ Techniques as simple and intuitive as a **word cloud** can provide a surprisingly effective visual summary of conversations, reviews, and user feedback about a new product.
- ▣ **Word cloud:** A visual depiction of a set of words that have been grouped together because of the frequency of their occurrence.





# Data Visualization Tools



**FIGURE 9.2**

## Word cloud

This Word cloud shows the topics covered in this chapter.

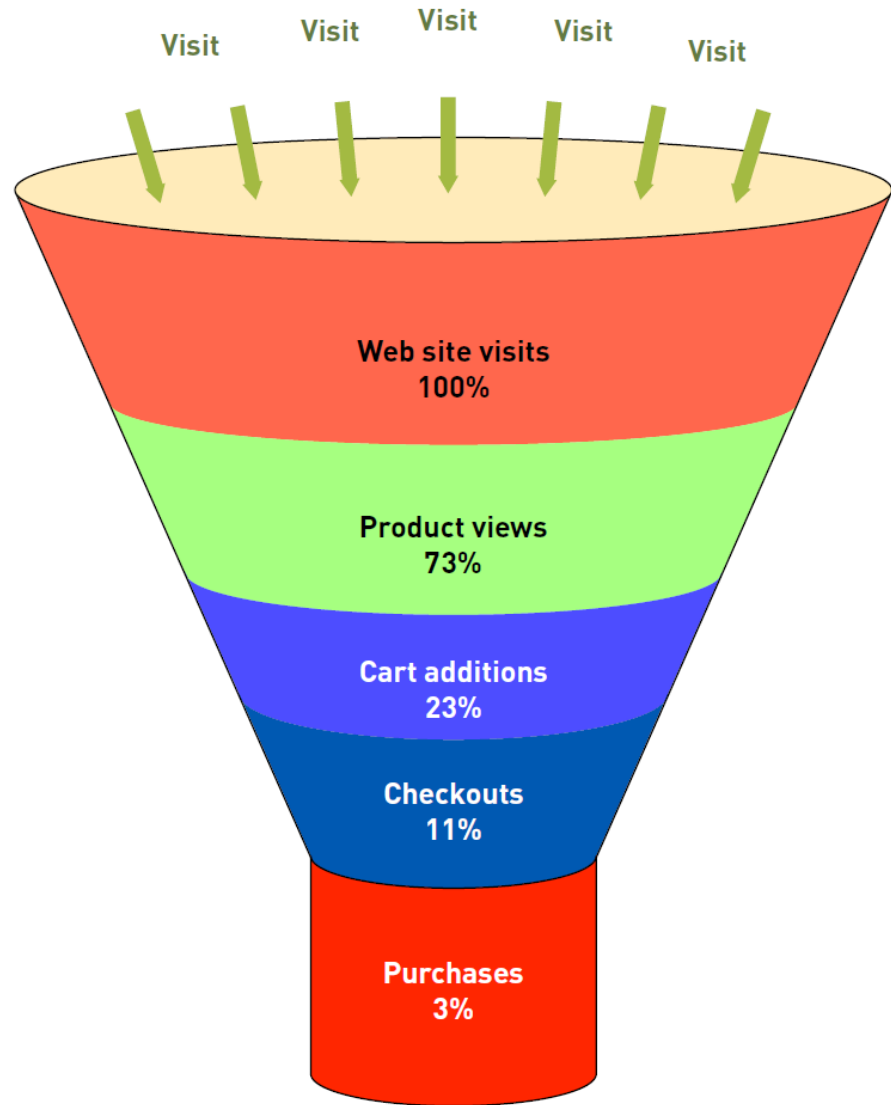
<https://wordart.com/create>



# Data Visualization Tools

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- ❑ A **Conversion Funnel** is a graphical representation that summarizes the steps a consumer takes in making the decision to buy your product and become a customer.
- ❑ Conversion Funnels enable decision makers to see what steps are causing customers confusion or trouble.



**FIGURE 9.3**

### **The conversion funnel**

The conversion funnel shows the key steps in converting a consumer to a buyer.



# Online Analytical Processing

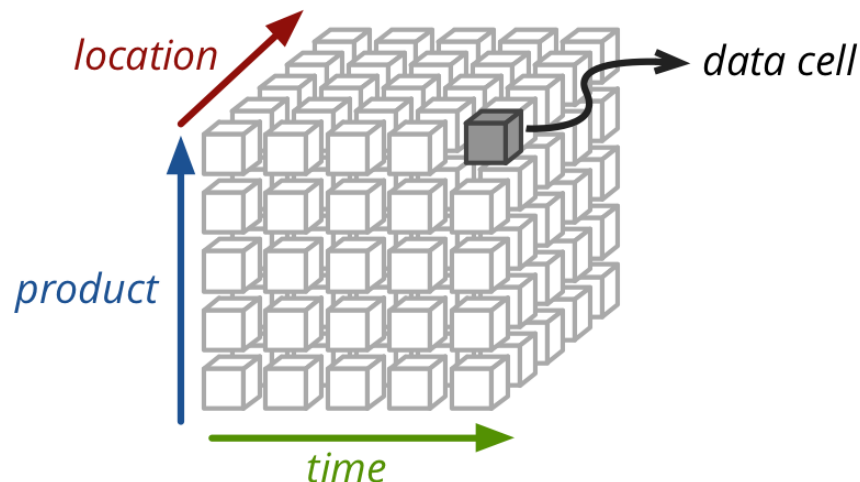
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- ❑ Online analytical processing (OLAP) is a method to analyze multidimensional data from many different perspectives.
- ❑ OLAPs enable users to identify issues and opportunities as well as perform trend analysis. Databases built to support OLAP processing consist of **data cubes**.



# Online Analytical Processing

- A **data cube** is a multi-dimensional array of values which is used to represent data along some dimensions of interest.
- For example, in OLAP such dimensions could be the products the company offers, the location where the products are placed to sell, and time;





# Online Analytical Processing

## Case Study: Starbucks

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- ❑ In the retail industry, OLAP is used to help firms to predict better customer demand and maximize sales.
- ❑ Starbucks employs some 149,000 workers in 10,000 retail stores in the United States.



# Online Analytical Processing

## Case Study: Starbucks

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- ❑ The firm built a data warehouse to hold 70 terabytes of point-of-sale and customer loyalty data.
- ❑ This data is compressed into data cubes of summarized data to enable users to perform OLAP analysis of store-level sales and operational data.





# Data Mining

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- ❑ **Data mining** is a BI analytics tool used to explore large amounts of data for hidden patterns to predict future trends and behaviors for use in decision making.
- ❑ Data mining tools enable organizations to make predictions about what will happen so that managers can be proactive in capitalizing on opportunities and avoiding potential problems.

**TABLE 9.2** Widely used BI software

Vendor	Product	Description
HP	Autonomy IDOL <sup>17</sup>	Enables organizations to process unstructured as well as structured data; the software can examine the intricate relationships between data to answer the crucial question “Why has this happened?”
IBM	Cognos Business Intelligence <sup>18</sup>	Turns data into past, present, and future views of an organization’s operations and performance so decision makers can identify opportunities and minimize risks; snapshots of business performance are provided in reports and independently assembled dashboards.
Information Builders	WebFOCUS <sup>19</sup>	Produces dashboards and scorecards to display a high-level view of critical indicators and metrics; the software enables users to analyze and manipulate information, with minimal training. It also supports dynamic report distribution, with real-time alerts, and fully automates the scheduling and delivery of vital information.
Microsoft	Power BI for Office 365 <sup>20</sup>	Allows users to model and analyze data and query large data sets with powerful natural-language queries; it also allows users to easily visualize data in Excel.
Oracle	Business Intelligence <sup>21</sup>	Offers a collection of enterprise BI technology and applications; tools including an integrated array of query, reporting, analysis, mobile analytics, data integration and management, desktop integration, and financial performance management applications; operational BI applications; and data warehousing.
Oracle	Hyperion <sup>22</sup>	Provides software modules to enable financial management; modules include those for budgeting, planning, and forecasting; financial reporting; database management; financial consolidation; treasury management; and analytics.
SAS	Enterprise BI Server <sup>23</sup>	Provides software modules to support query and analysis, perform OLAP processing, and create customizable dashboards; the software integrates with Microsoft Office.



# Analyzing Social Media Data

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- ❑ In analyzing social media communications from sources such as text, video, and chat as well as “likes” and “shares,” many experts agree that the most significant data is not the content itself, but rather the **metadata** (data that describes other data).



# Analyzing Social Media Data

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- For instance, metadata about social media use could relate to properties of the message (e.g., whether the message is comical, sarcastic, or genuine) and of the author (e.g., gender, age, interests, ideological beliefs, and degree of influence on the audience).



# Analyzing Social Media Data

- The metadata enables analysts to make judgments about how to interpret and value the content of the message. Without the important metadata, it is not possible to know the value of the communications and how to take effective action.



# Decision Support System (DSS)

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- ❑ A DSS is an organized collection of people, procedures, software, databases, and devices used to help make decisions that solve problem.
- ❑ A DSS is used at all levels. It supports individuals, small group, and the entire organization.
- ❑ The focus of a DSS is on decision-making effectiveness regarding business problems.



# Characteristics of a Decision Support System

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- ❑ Some important characteristics:
  - ❑ Provide rapid access to information
  - ❑ Handle large amounts of data from different sources
  - ❑ Provide report and presentation in both textual and graphical orientation
  - ❑ Support analysis
  - ❑ Improve the effectiveness of the decisions



# References

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- ▣ **Reynolds, George Walter, Stair, Ralph M.**  
“Principles of information systems”, 13e – 2018