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MIS

Business Management Systems

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MIS

Moore's Law

Moore's Law states that the number of transistors on a computer chip doubles approximately every 18 months. Additionally, the price of transistors will correspondingly decrease.

Originally, he stated that the number of chips would double every 2 years, but he later revised this estimate.

While he never coined the term "Moore's Law," this estimate now bears his name and has proven to hold true for the past 60 years.
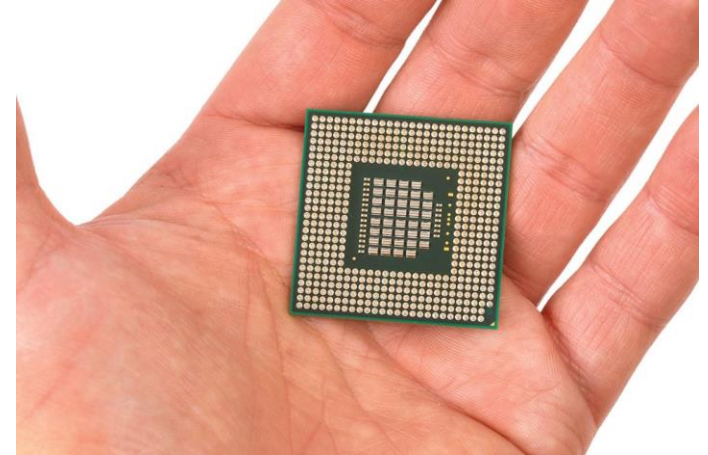
Moore's Law (cont.)

- You have probably noticed that you need to replace your electronic devices approximately every 4 years.

- One reason for this is that programmers continually write software that uses the increased computing capability of new smartphones and other computers.

- This means that older devices will run more slowly as the software becomes more demanding.
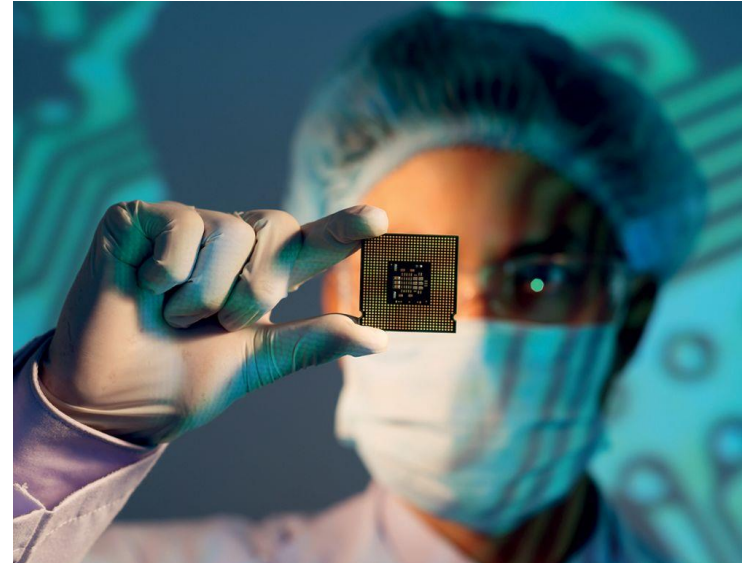
Advancements in Business Management Systems

Business management systems seek to increase management efficiency by capitalizing on the technological advances made in the areas of management.

As capabilities improve, the expectations of these systems accordingly increase.

Advancements in Business Management Systems Examples

In the 1980s

A college student in the 1980s could anticipate receiving a paper copy of a course syllabus during the first week of class.

The student would be responsible for keeping this syllabus for the rest of the semester.

Present Day

Today's students expect to be able to view a syllabus, from any course, at any time from their phone.

The same is true with employee benefits or compensation records, with work schedules and retirement plans.

Business Management System Components

Components of Business Management Systems

Business management systems need three major components in order to provide the services expected by today's managers.

These include:

1. A database management system (DBMS)

2. A predictive information system

3. A decision-making information system

Components of Business Management Systems: The Database Management System

The **database management system (DBMS)** serves to store and classify information that would be useful to the manager.

A DBMS accepts inputs, provides for input verification, stores data, allows for data searches (queries), and allows managers to create reports.

Shared Database With Employees

DBMS

Personnel Dept.
This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

Account Dept.
This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

Loan Dept.
This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

Components of Business Management Systems: The Decision Making Information System

Decision Making Information Systems

- **Decision-making information systems** integrate the DBMS with the predictive information systems to assist managers in making decisions

- Decision-making information systems are designed to work with a limited number of inputs and unknowns, and to provide managers with a statistical analysis of likely outcomes

  - most of these systems provide a recommended course of action, allowing the manager to make the final decision

Business Systems Implementation

Implementing Business Management Systems

When managers decide to use business management systems they need to make several decisions and ask themselves questions such as these:

- How will the new system interact with existing systems?

- Is the change worth the expense and impact on employee morale?

- Where will the new system be housed?

Interaction with Existing Systems

Managers often believe their organizations will benefit from an upgraded business management system. This is particularly true if they are accustomed to using a different system with a different employer.

When making a decision to implement a change, managers should remember that any change brings short-term stress and decreased productivity.

Managers must ensure the improvements derived from the transition will be worth the expense and the impact on employee morale.

- for example, the business probably already has an employee compensation program, moving to an updated system will likely create anxiety in the workforce, particularly in human resources, and will almost certainly require significant employee training

Housing a New System: On-Premises Option

An **on-premises solution** provides the organization with complete control of the management system. It has major advantages:

- it can be configured to meet the unique needs of the organization
- any changes deemed necessary can be implemented extremely quickly

The disadvantages of this arrangement include:

- **Implementation costs: h**ardware and software have large up-front costs
- **Hiring and keeping qualified technicians:** information technology professionals enjoy a high-demand profession
- **Maintaining, and updating the system:** among the most challenging demands placed on your IT staff will be ensuring that the systems are updated
- **Securing the system:** the IT staff must constantly be aware of all of the latest security risks to the system

Cloud-Based Custom Option (PaaS)

Using the Cloud to store and maintain systems offers several advantages over on-premises systems.

- cloud storage sites are typically hardened and deploy substantial security systems that can significantly reduce the risk of hackers
- server size can easily be scaled as business management software requirements increase

The downside of housing, a management solution on the Cloud is that the manager loses control over the costs and the speed at which changes are implemented.

Common Cloud-based options include a platform as a service (PaaS) or an infrastructure as a service (IaaS) system.

- with PaaS or IaaS, the customer can run their own custom programs while the hardware and software infrastructure is maintained by the cloud hosting firm

Software-as-a-Service (SaaS) Option

Purchasing a **Software-as-a-Service (SaaS)** solution provides many advantages to both keeping the hardware and software on premises and storing a custom management system on the Cloud.

- a major advantage of using SaaS systems is that they are updated by a third-party that has a major financial incentive in ensuring that the software is in compliance with the latest regulations
  - security concerns are minimized as the SaaS provider undoubtedly has greater resources and expertise in security management than most firms
  - additionally, choosing a SaaS solution minimizes the initial implementation expenses incurred by hosting the software on-premises or having software engineers design a custom solution

The downside is that while some SaaS packages can be customized, by-and-large the manager has to take the system as it is given.

Human Resource Management

Human Resources Management Systems

Human resources management (HRM) refers to the strategic use of employees to allow organizations to operate efficiently and gain competitive advantage and focuses on:

- scanning the environment to determine future HR needs

- examining the business to measure current HR capabilities and shortfalls

- recruiting, hiring, training, retaining, compensating, appraising, promoting, reassigning, and firing employees

- managing employee grievance, absences, sick days, and paid-time-off days

Human Resources Management (HRM) Systems: The Legal Framework

Because of the extensive governmental oversight regarding employees, HRM involves a significant degree of legal expertise.

- for this reason, many HR managers outsource many HR responsibilities or depend on HRM systems to support their efforts.

Human resource management systems combine multiple processes to ensure that HR functions are managed efficiently and in accordance with the most current regulations.

This requirement for constant updating to match changing legislation, along with the need for unimpeachable data integrity, has led to many firms to use online software as a service (SaaS) options for maintaining their HRM programs and records.

The History of Human Resources Management Systems

Human resources management systems have existed as long as recorded history.

- Egyptian hieroglyphics indicate that a significant number of scribes and priests were dedicated to the organization of workforces

- Armies have always needed management, and systems were devised to organize these large, mobile organizations

- the development of computer systems during the second half of the 20th century allowed for significantly more sophisticated management support

SAP and Modern HRM Solutions

During the 1970s, Xerox and IBM developed software that tracked payroll and compensation for corporations with mainframe computers.

- the foremost software engineers working on this project were based in Baden, Germany, and when IBM executives decided to cut the program, they formed their own corporation, naming it Systems, Applications, & Products (SAP).

While corporations such as SAP and Oracle focus on serving the needs of major corporations, numerous smaller firms have found niche opportunities by identifying the needs of small and mid-size companies.

Some, such as ZipRecruiter and Indeed, aim primarily at the recruiting and hiring needs of firms.

The Roles of an HR Manager

A short list of the items an HR manager must consider includes:

- Recruiting, selection, hiring

- Employment agreements

- Evaluation policies

- Absentee, tardiness, sick leave, and PTO policies and adherence

- Dress policies, gifts, meals, and break policies

- Severance, bereavement, dismissal policies

- Discrimination, harassment, and fraternization policies

Recruiting and Hiring Software

The number of variables involved in calculating future workforce needs makes this determination highly complex.

Human resources managers need sophisticated software to assist them in making accurate estimates of recruiting, hiring, and training requirements.

Recruiting and Hiring Management Systems (Example)

Imagine that you are an HR director for a regional airline.

- previously, you could depend on a large number of former military pilots seeking jobs, but with the downsizing of the military, that pool of potential applicants has decreased

- at the same time, an increase in customer demand, combined with record-low interest rates, have allowed your firm to purchase additional aircraft

- recently, the Federal Aviation Administration increased the mandatory retirement age of commercial pilots from 60 to 65 years

- complicating the issue, a slow-down in aircraft delivery due to manufacturing challenges has caused major airlines to temporarily decrease their hiring levels

Compensation Management Software

Employee compensation (comp) strategy can make or break a corporation.

- whether the firm uses primarily hourly, salaried, or independent contractors; ensuring that these employees are compensated correctly is key to a company's success

- while employee compensation software at major corporations may be included as part of its enterprise resource planning suite, smaller firms often turn to companies such as Payscale.com, Payfactors.com, or Salary.com to meet their compensation management needs

Employee Benefits Administration

Benefits administration refers to enrolling, maintaining, managing, and discontinuing benefits for employees and often for their dependents.

Benefits management must track employee hiring dates, marital status, benefits choices, and usage.

- the need for tracking and the complexity of modern benefits programs, has led many firms to turn to Software-as-a-Service (SaaS) solutions such as Zenefits and BenefitFocus to manage their employees' benefits systems

Inventory System Management

Inventory Management Systems

Modern **inventory management systems** focus on inventory optimization.

This includes accurate determination of the re-ordering point and the order quantity levels.

- the re-ordering point identifies when stock needs to be replenished based on the sales or usage rate and the logistics timelines, also known as lead time

- this information can then trigger automatic re-orders, or provide data to inventory managers to allow them to more accurately place orders

Use of Inventory Management Systems

Inventory management is often critical to a business's success.

- overstocking inventory drives up production costs, as assets that could be used elsewhere are needlessly tied up in unneeded inventory

- for example:
  a grocery store must reduce prices and ultimately dispose of overripe fruit

- an electronics retailer must mark down outdated smartphones

Alternatively, the lack of necessary inventory can bring production to a halt or cause lost sales and dissatisfied customers.

UPC and RFID

To assist managers as they attempt to determine the correct levels of inventory, highly sophisticated inventory management systems were among the first business management systems ever developed.

Universal Product Codes (UPC)

- in the early 1970s, the modern era of inventory management systems evolved with the development and the adoption of UPC as the standard barcode for grocery stores in the United States
- with the widespread use of personal computers in the 1980s, inventory management became available to virtually every firm in the U.S. and Canada

Radiofrequency identification (RFID)

- radiofrequency identification (RFID) technology allowed significantly faster (real-time) inventory tracking and management

Customer Relations Management

Customer Relationship Management (CRM) Systems

A **customer relationship management (CRM) system** seeks to manage a firm's interactions with customers using analytics and data analysis to identify the most valuable customers and target future customers.

- by tracking consumer behavior, focus is on the customer experience in order to attract and retain customers, with the ultimate goal of increasing sales, market share, and profit

CRM is also used to promote strong relationships with suppliers and other colleagues.

CRM: Retail Focus

In many retail industries, CRM is the most complex, and expensive, segment of a business management system.

- it typically includes everything from social media, to call centers, and even integrates supply chain management

- it typically begins by collecting customer information such as email, telephone, and social media data, and then combines this with information regarding the customer's buying habits, so that the management team can gain a better anticipate customer desires

CRM in Business

To maximize a sale force's efficiency and effectiveness, managers use customer relationship management systems to:

- target profitable customers

- improve pricing decisions

- enhance customer service

- create individualized products

- customize marketing messaging to personalize and enhance each customer's experience

CRM in Business: Background

Modern CRM programs began in the early 1970s with the introduction of mainframe computers in businesses.

- this technology allowed large firms to track customer purchasing behavior and categorize the customers in order to better segment the market and target high-value customers

- in the 1980s, the widespread use of personal computers allowed small businesses to also use stand-alone CRM software

- as a response to this competition, large business software providers such as SAP, Oracle, Microsoft, and PeopleSoft began to include CRM software within their business management systems software

- PeopleSoft was acquired by Oracle in 2005, by which time nearly all CRM software solutions had moved to the cloud

Customer Relationship Management (CRM) Systems Options

Examples of CRM Systems

- Salesforce remains one of the largest suppliers of CRM software solutions. Salesforce software integrates with Oracle, QuickBooks, SAP, and other business management software

- SAP includes embedded CRM modules in its enterprise resource planning software, as does Oracle, and Adobe, and Microsoft

- businesses such as HubSpot CRM, Zoho CRM, and Freshsales CRM focus primarily on meeting the CRM needs of smaller businesses that might not use a full enterprise resource planning system
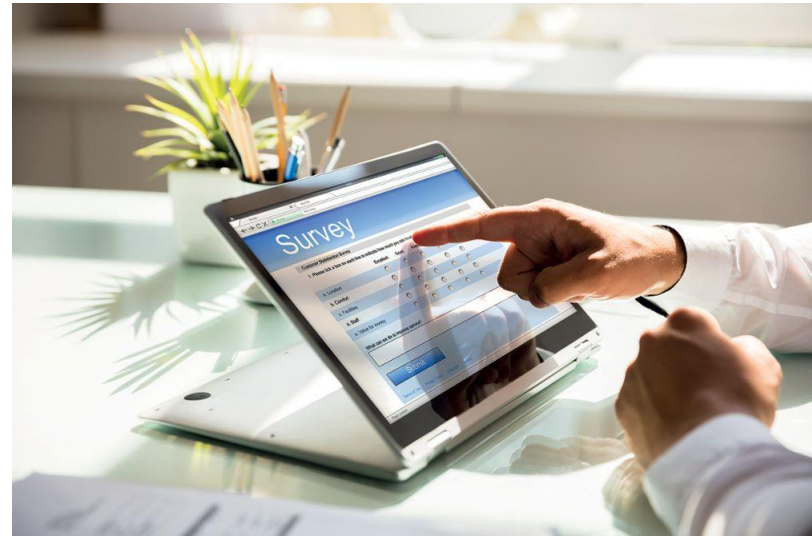
Decision-Making Management Information Systems

Increased information should lead to improved decision-making.

- integrating database management systems (DBMS) with predictive analytics, decision making management information systems give managers a the recommended course of action, allowing for more informed decisions

- **Decision-making management information systems** provide managers with tools to assist them in using this data to improve decision making

Business Process Management

Business Process Management (BPM)

Business process management (BPM) streamlines an organization's activities to prevent backlogs and inefficiencies.

Modern BPM systems can work with structured and repeated processes (projects) or with processes that are varied and less predictable.

BPM includes program management, unstructured processes, and variable processes

Business Process Management (BPM) (cont)

Five steps of BPM:

1. Examining the design of the process

2. Modeling the process

3. Running the process

4. Monitoring the process

5. Initiating process improvements

BPM: Step 1 Process Design

The process design step examines processes and breaks them down into their individual components.

- this can be done with existing processes or desired (future) processes

- in this step, analysts typically "storyboard" the processes in an attempt to view the entire system prior to investigating each component

BPM: Step 2 Process Modeling

The **modeling step** provides decision makers with recommendations when shortages or excesses occur.

Analysts use flow-charts and other tools to depict the workflow, the sequence of operations, and the decision points.

- by examining each decision point and the inputs around which each decision is based, analysts model how each decision would change depending on input variation

- once the process has been sufficiently modeled the entire process is written using software called business processes execution language (BPEL) so that it can be run in a BPEL engine
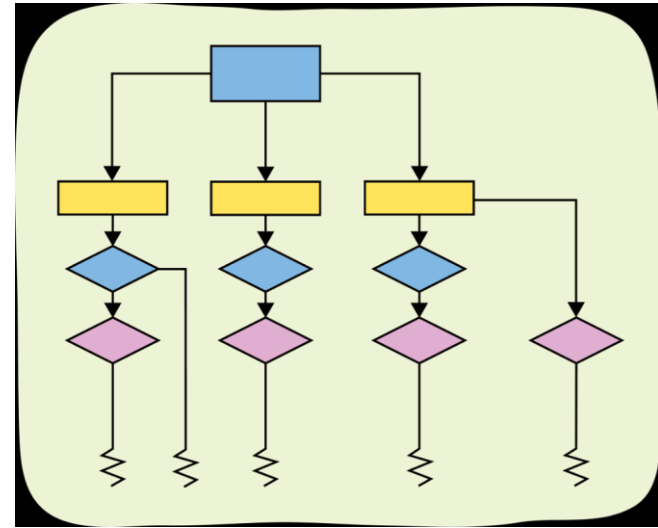
BPM: Step 3 Process Execution

Once a process management engine has been designed, modeled, and written in a business process execution language (BPEL) the process engine can be run.

This is called the **execution step** and it provides managers with real-time (executable) decision making as well as the ability to play the "what-if" game by changing input variables (abstract) decision making.

BPM: Step 4 Process Monitoring

After the business process engine runs, managers track the individual components of the process as well as the process as a whole so that the performance of the engine can be measured.

This step allows for **business activity monitoring (BAM)** as well as allowing for predictive business process monitoring, in which managers input variables into the system and track the changes to process outputs.

BPM: Step 5 Process Optimization

When bottlenecks or excesses are identified during the process monitoring stage, managers adapt the process to enhance process performance.

This is known as the **process optimization step.**

By identifying potential slowdowns or savings opportunities, the process optimization step allows managers to create a continually improving process.

After the improvements are implemented, the process is again executed and the results of the implemented changes are analyzed.

Project Management Systems

Project Management Tools and Processes

Project management (PM) software can prove an indispensable aid in the successful execution of projects.

A project has a start and end point and specific deliverables.

- building a house is a project
- maintaining a house requires management, but not project management

PM software allows managers to make use of Gantt charts, and implement the four major phases of the PM process.

Project Management (PM) Systems Software

Program Management (PM) software provides common tools such as rescheduling tasks due to shifting deadlines and generating reports for the stakeholders affected by any changes.

Most project management (PM) systems software today is located on the cloud.

- this reduces security risks and enables collaboration among the various stakeholders in the project

Project Management (PM) Systems Software

PM systems software:

- provides storage so that stakeholders can upload and share files such as contracts or receipts

- provides visual depictions of the projects, such as Gantt charts, so stakeholders can see the progress

- includes permissions levels, to ensure that suppliers, for example, are not able to view those parts of the project management system that do not apply to them

# Gantt Charts and the Four Phases of the Project Management (PR) Process

A **Gantt chart** displays a project in its component parts.

Some tasks can be done concurrently while other tasks are dependent upon the completion of preceding tasks.

Each task is then depicted on the chart, displaying an estimate of its time requirement.

Gantt charts highlight the four phases of the PM process:

1. the initiation phase
2. the planning phase
3. the execution phase
4. the closure phase
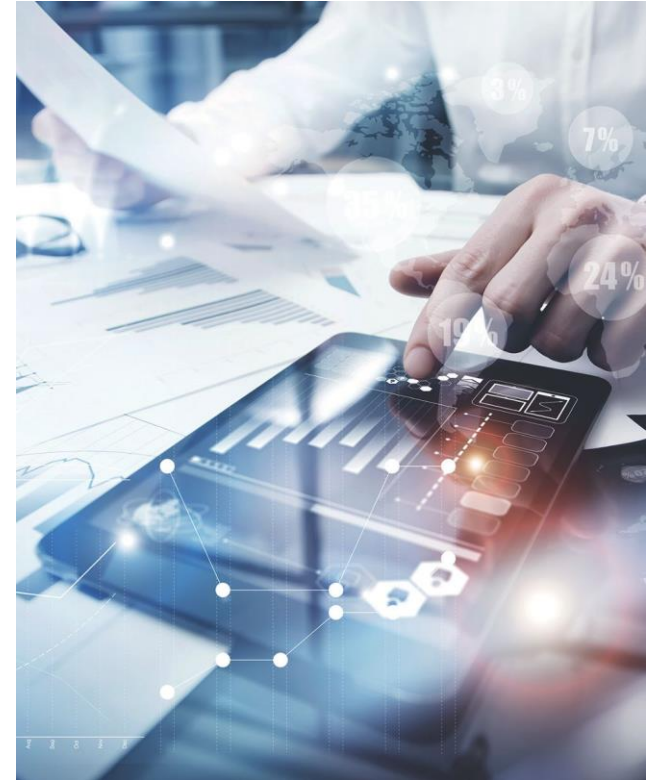
PMP Phase 1: The Initiation Phase

The initiation phase begins by identifying project goals, perhaps because an opportunity has arisen (a client presents a request) or through a brainstorming session.

Once project objectives have been identified, managers conduct feasibility studies to determine whether or not the project will realistically accomplish the stated goals.

- during the initiation phase the project's scope and a projected timeline for deliverables
- stakeholders in the project are identified
- a statement of work or other working agreement is created

PMP Phase 2: The Planning Phase

The **planning phase** is typically when a Gantt chart is created, or fine-tuned if one was started during the feasibility study.

The Gantt chart divides the project into its component parts — depicting when supplies, labor, permits, and other resources are needed.

The final step in the planning phase involves scheduling a meeting with project stakeholders and allowing these key players to review the Gantt chart and the project timeline.

- this coordination step is critical in ensuring everyone understands their role in the project

PMP Phase 3: The Execution Phase

The **execution phase** of the project is typically what people think of when they consider working on a project.

Managers constantly monitor the progress of the project and the project's resources.

- A Gantt chart, or more accurately, a Gantt chart software system, can greatly simplify progress and budget tracking

  - for example, if one task is taking longer than anticipated, the PM software might recommend delaying the purchase of inventory needed to complete a dependent task, saving valuable resources

PMP Phase 4: The Closure Phase

During the **closure phase**, managers document the lessons they learned during the project's execution.

- helps managers anticipate challenges and estimate costs for future projects

- provides an opportunity for all stakeholders to discuss how closely the project met expectations

- ends all associated contracts and accounting for all used and unused resources

Business Intelligence

Business Intelligence (BI)

Business intelligence (BI) uses data mining techniques that combine and then add data visualization tools so that managers can make faster, more informed, decisions.

Data mining techniques include the ability to access external databases as well as data that the firm has collected itself (internal data).

Predictive analytics uses algorithms to determine the most likely outcomes given a set of inputs.

Visualization tools display information in a manner that makes it easier for managers to assimilate or to see patterns

Business Intelligence (BI) Working with Nuances

Because many managers must base decisions on nuanced information, modern BI software provides not only the probable outcome, but also the degree of likelihood of the outcome.

- these degrees of likelihood are sometimes referred to as confidence levels, degrees of certainty, or error rate

- knowing the degree of likelihood in the predicted outcome allows managers to build contingency plans

By using both internal and external data, business intelligence can assist managers in identifying potential opportunities and threats to their firms.

Business Intelligence Implementation

In order to use the capabilities of business intelligence (BI), managers must first determine which BI system will work best with the associated stakeholders.

If users do not understand the process, or find it too cumbersome to use, the BI software is worse than useless as it will unnecessarily waste an organization's resources.

- compounding this, it can lead senior management into making sub-optimal decisions

Business Intelligence Implementation: Getting Buy-In

Getting buy-in from all stakeholders is essential if the Business Intelligence (BI) system is to be of any value.

The best way of implementing a new BI system is to make it as seamless as possible by using BI software and tools with which the users, typically first-line employees, supervisors, and junior management, are already familiar to the maximum extent possible.

For this reason, managers should choose BI software from an organization with which their employees are familiar.

- for example, if the business is using QuickBooks, a savvy manager would purchase a business intelligence software from Intuit

Data Science, Big Data, and Data Visualization Tools

Why use Data Science and Big Data Analytics?

The need for improved data analytics becomes obvious once the acceleration of database growth is understood.

Without the tools provided by data science and big data analytics managers would quickly become overwhelmed by the sheer volume of information available.

This can result in managers making poor decisions because searching and deciphering the information is simply too difficult to contemplate without the use of analytics.

Data Science and Big Data Analytics

Data science refers to the process of gathering, storing, and searching relevant data.

Big data analytics refers to the technology and processes used to gain intelligent, usable information from these databases.

Data visualization tools are used to convey meaning from big data analytics to managers who need to make decisions based on this data.
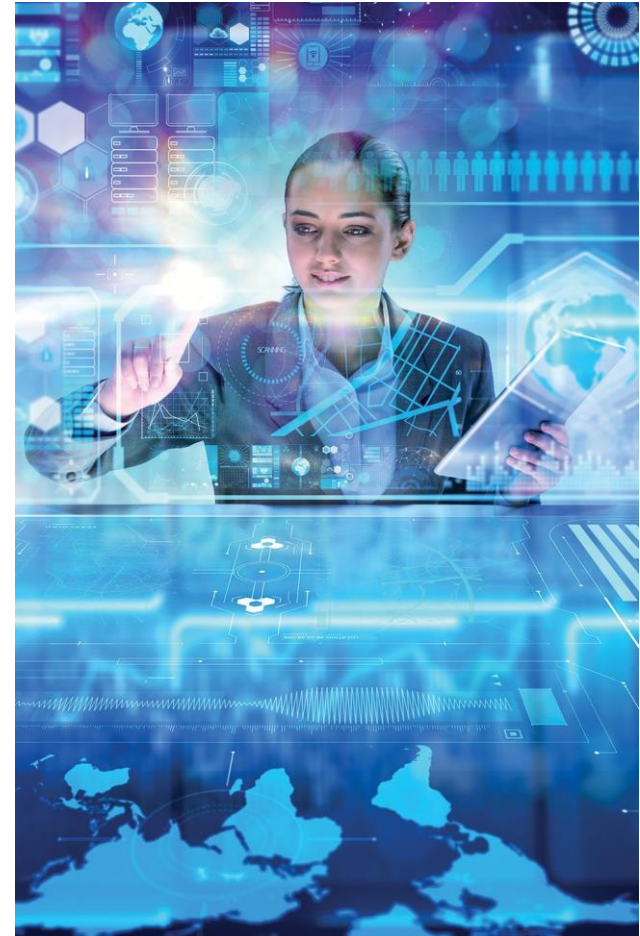
Data Visualization Tools

Business intelligence (BI) and associated big data analytics have no value if it cannot be interpreted and presented effectively to decision-makers.

One of the most important features of any BI system is its **data visualization tools**.

Nearly all BI software platforms have a **dashboard presentation** that displays an overview of the data that is presented.

- most dashboards offer a scroll-over feature that allows the user to dig deeper into aspects of the analytics

Data Analytics Software Platforms

Data analytics software assists managers by examining large quantities of data and parsing it into usable information.

There are numerous choices for managers, so often the decision will be based upon what business information (BI) systems the organization is already using.

Data Analytics Software Platforms: Options

For firms using SAP, **SAP Analytics Cloud** might be best. It has extremely powerful analytics, but is challenging to learn.

Tableau (owned by Salesforce) is also very powerful and popular, but like SAP Analytics Cloud, it has a reputation of being challenging for beginners to navigate.

Microsoft's **Power BI** is also quite powerful, and reputedly easier to use than either Tableau or SAP Analytics Cloud.

Oracle Analytics Cloud would be a likely choice for organizations that are already using other Oracle tools.

- like SAP and Tableau it is one of the most powerful data analytics platforms, but also has a reputation of having a steep learning curve

Looker (owned by Google) integrates easily with Google Docs, and uses a natural search language engine that makes queries easy.

Implementing Business Management Systems: Housing a New System - On-Premises Option

An on-premises solution provides the organization with complete control of the management system. It has major advantages:

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