MIS

Investigating MIS

What is MIS?

Management Information Systems (MIS) refers to the intersection of technology, people, and processes in organizations and businesses.

It relates to all aspects of businesses and how to maximize the strengths of a business through the use of technology and information.

Management information systems (MIS) lie at the conjunction of people, businesses, and ideas.

Everyone in business depends on an information system.

As the advancements in technology have accelerated, so too have the capabilities of management information systems.

What is MIS? (cont.)

The old definition of a system that calculates incoming revenue and outgoing expenditures no longer suffices.

- modern management information systems provide recommendations for decisions in all areas of business, from which resumes to review, to how many pencils to order

- modern enterprise resource planning systems combine the capabilities of human resource management systems, to customer relation management systems, project management systems, and a host of others

- an management information system helps the business professional visualize the big picture, turning large amounts of data into usable information

  - this allows the manager to focus on strategic planning, implementing new ideas, and above all, taking care of employees so that they can be as productive as possible

Impact of MIS on Management Theory

Great management revolves around the ability to communicate—conveying concepts, goals, and requirements throughout an organization to ensure that everyone understands their role in the enterprise.

Modern Communication

E-mail, office productivity software (data processing, word processing, etc.)—all of these capabilities have exploded in the past two decades.

The use of management information systems for communication and decision making continues to increase and improve every year.

Management Theories of Peter Drucker

Peter Drucker (1909–2005) was sometimes called the "Guru of Management."

Drucker believed that the primary responsibility of any corporation is to serve its customers and that profit, while not a goal, is an essential condition for any company's sustainability.

He believed that most corporations work best when:

- they are decentralized
- they outsource work in which they do not have a comparative advantage
- hey focus on those areas in which they have a comparative advantage (their core business)

Mainframe Computers

Mainframe computers are known for their reliability, availability, and serviceability.

The Mainframe computer role in management information cannot be overemphasized.

Use of Mainframes

- developed to be reliable for transaction processing systems

- used for what are now called database operations: inventory control, reservation services, bank records

- continue to be used for these traditional uses, but are also used in enterprise resource planning

Personal Computers

In business, personal computers are often networked together or added to networks to provide flexibility for managers.

Business uses

- personal computers are used for every conceivable managerial use, including:

    - correspondence through e-mail

    - composing documents

    - online communications using applications such as Skype and WebEx

    - database access and even creation

    - use and creation of spreadsheets

- personal computers are even more commonly used in business as they can be used to access the Cloud

Client-Server Networks

Client-server networks and local area networks are commonly used in nearly all businesses today, including small businesses.

What is a server?

A server is a computer designed for a specific purpose such as data storage, backups, printing, communication, and many other uses.

What do business networks provide?

- method for personal computers to access servers so employees can share resources

- security and authentication processes to keep business information confidential

- access through the Internet (users access the network's resources remotely)

Cloud Servers

Cloud computing refers to accessing computer resources through the Internet.

This means that any Internet-capable device can access powerful computing capability that is available online.

Benefits of Cloud Computing

- most large companies use over 100 terabytes of stored data

- cloud computing allows users to access virtual applications software, such as database software, through the Internet

- in addition, Cloud computing allows users to access virtual applications software, such as database software, through the Internet

Cash Registers

The need for accurate transaction processing drove the initiative for the first management information systems and led the push for improved MIS technology for decades.

The first modern transaction processing system was the cash register.

- cash registers included a drawer for cash and an adding machine that totaled the amount of cash that entered or left the register

- the cash register included a bell that would ring each time the cash drawer was opened, alerting the shop owner

  - this became known as "ringing up" a customer

Transaction Processing Systems

The revolution in personal computers that developed in the 1990s allowed for far more capable POS (point-of-sale) systems.

As well as hardware advancements, the requirement to meet the needs of such a diverse group of end-users made POS systems one of the most complex software design challenges ever devised.

Transaction Processing Systems (cont.)

Key Features of POS Systems

- as well as tracking sales and taxes, POS systems software now provides discount calculations, inventory tracking, ordering, vendor communications, customer relationship management interface, bookkeeping, and accounting capability

Integration with Other Devices

- a typical retail point-of-sale station may integrate the cash register system with multiple input devices, such as barcode scanners; scales; touchscreens; MICR (check) readers; credit/debit card readers, often with separate tactile numerical keyboards (useable by the blind); cameras; RFID tag readers; and many others

Benefits of Cloud Computing

- because POS systems are networked, price changes can be accurately and reliably implemented at all stations simultaneously. Cloud computing has enabled sales and inventory tracking across entire retail chains

Mobile POS Stations

The development of commercially available mainframe computers allowed large retailers to transition from traditional cash registers to electronic POS systems that offered centralized management and provided much more information for managers.

These mainframes could control up to 128 POS stations.

Guiding Condition	Driving Technology
The need for accurate transaction processing drove technology. These mainframe-sales station systems were the first available client-server and local area networks, providing peer-to-peer communication and simultaneous backup.	The benefits and the market potential for this technology resulted in IBM's development of smaller "micro-computers," capable of operating up to eight POS stations for smaller businesses.

First Commercial Example of Mobile POS Systems

The first commercial use of these micro-networks was in McDonald's restaurants.

- employees simply pressed the button that corresponded to each menu item that the customer ordered: for example, two small fries

- when the order was complete, the employee simply pressed the Total button, which would also calculate the necessary sales tax and print a receipt for the customer

  - this greatly increased accuracy and decreased both customer wait time and employee training time

Examples of Mobile POS Stations

Square, Inc., entered the POS system industry in 2010.

About Square, Inc.

- Square began selling its credit/debit card readers that could be connected to mobile devices such as smartphones and tablets

- by charging a flat fee of 2.75 percent of each transaction, Square became a quick favorite of entrepreneurs and small businesses

- within five years, Square had competitors such as Payment Depot and Lightspeed Retail

Examples of Mobile POS Stations (cont.)

Cloud-Based MIS Support

Most mobile POS systems offer cloud-based management information systems support:

- Inventory management systems

- Vendor and purchase order tracking

- Employee credentialing software

- Customer relationship management systems

- Payroll support systems

Retailers can use barcode scanners and a traditional cash drawer with mobile POS systems.

Employee Scheduling Software

Just as cash registers were developed to decrease employee pilfering, **employee scheduling tools** were originally designed to increase employee performance and decrease management inconsistency.

Benefits of Scheduling Software

- employee scheduling software eliminates tedious administrative duties by maintaining scheduling tasks

- this is particularly necessary in professions such as nursing and aircrew, where many variables must be considered when making schedules

Decision Support Systems

Decision support systems (DSS) assist middle managers with organizational processes when a large number of inputs are changing rapidly.

Uses

- one of the first applications of a DSS was used in assisting United Airlines managers to assign incoming aircraft to gates at Chicago's O'Hare Airport

- most DSS provide real-time guidance while the final decision is made by the manager

- DSS are used extensively to assist medical personnel in diagnosing patient issues, farmers with crop irrigation and fertilizing, and also in the transportation industry

Supply Chain Management Systems

Supply chain management systems (SCMS) have been changed dramatically with the addition of computerized communication and tracking software.

Components	Example
Supply chain management generally consists of four components. •Supply chain planning •Supply chain sourcing (partners, suppliers) •Manufacturing and assembly (operations) •Supply chain logistics (delivery and return) Modern SCMS software serves managers by maximizing the efficiency of each of these processes.	Radiofrequency identification (RFID) tagging allows distribution managers to analyze the movement of materials through every step of the logistics processes. This supply chain visibility helps to eliminate the "bullwhip effect," whereby a small error in demand forecasting results in large errors in inventory and production.

Human Resource Information Systems

Human resource (HR) management systems have closely followed the development of computers.

Development of HR Systems

- **Mainframe Computers:** The first automatic payroll and employee evaluation processing began with the widespread use of mainframe computers in the 1970s

  - these systems allowed large organizations to track employee compensation and performance evaluations digitally, allowing for improved forecasting of human capital requirements

- **Client-server Systems:** The introduction of client-server systems and local area networks made it possible for smaller organizations, which did not have access to mainframe computers, to gain these same advantages on smaller scales

- **Cloud-based Solutions:** Since the early 2000s, an increasingly large number of businesses use cloud-based HR solutions

Human Resource Information Systems (cont.)

Functions of HR Management Systems

- the primary functions include forecasting, recruiting, selection, hiring, evaluation, training, retention (reassignment, promotion, and grievance management), scheduling, and compensation (payroll and benefits administration)

- many modern HR management systems provide gamified analytics, which attempts to motivate employee training and retention with badging and bonuses

Marketing Information Systems

Marketing information systems (MKIS) assist managers by integrating numerous processes related to marketing management into a single computer system.

MKIS Data Processes	Information in MKIS Data
•Gathering marketing data •Storing the data •Analyzing •Distributing sales and marketing information to appropriate users	•Marketing research and environmental scanning •Customer feedback •Industry trends •Advertising campaigns of competitors

Marketing Information Systems (cont.)

Use of MKIS Software

MKIS data information can be used to construct marketing models, assist managers with cost-benefit analyses, and gain better insight into an advertising campaign's return on investment for a business.

Most MKIS also integrate with customer relationship management systems because of the overlap in such areas as sales, customer feedback, and returns.

Major MKIS software providers

- Marketo

- HubSpot

- Sailthru

Learning Management Systems

Learning management systems (LMS) are used to manage academic processes at nearly all large educational organizations.

Processes managed through an LMS include:

- delivering and administering class activities and assignments
- tracking student performance through gradebook management
- reporting student attendance and performance
- documenting student activity

By far, the market leaders in LMS software in U.S. higher education are Blackboard and Canvas, each with approximately a 30 percent market share.

Executive Support Systems

Executive support system (ESS) software, sometimes called **executive information system (EIS)** software, is used to extract enterprise data and transform it into executive-level reports.

This makes complex data more accessible for decision makers.

- ESS is particularly strong in creating graphs and charts that can quickly convey significant amounts of information

- ESS provides executives with drill-down capability so that information can be analyzed

Enterprise Resource Planning Systems

Enterprise resource planning (ERP) integrates the management of nearly all aspects of an organization.

Typically, ERP incorporates a suite of business applications into a unified system.

The rapid adoption of ERP systems in many companies has resulted in information technology (IT) costs to become the largest single category of expenses for U.S. businesses.

Supported Applications

Business applications supported and coordinated in ERP include finance and accounting systems, human resource systems, production systems, logistics (supply chain management) systems, customer resource management systems, sales and marketing systems, and many others depending on the type of organization.

Enterprise Resource Planning Systems (cont.)

Availability of ERP Systems

- increasingly, ERP forms/reports are available on mobile devices, making the information more accessible. ERP also enables executive support system (business intelligence) integration

- because of the development of Cloud-based ERP systems by firms such as Microsoft, SAP, and Oracle, ERP systems are now available for smaller businesses that may not have the capital to invest in large in-house IT systems and specialists

  - cloud-based ERP systems are easily scalable to meet the needs of smaller companies

Work Life Balance

Because business information is increasingly available on the Cloud and often accessible even on mobile devices, the idea of getting away from the office may no longer be possible.

MIS Benefits	MIS Risks
Management Information Systems (MIS) enable many to: • use flexible work schedules • telecommute • work from home But this is at the cost of never actually taking a break.	Employees often exacerbate the situation by staying "plugged in" far longer than required: • to avoid the appearance of taking advantage of employer accommodations such as flextime • for fear of falling behind what they perceive as more-responsive co-workers

Strategies for Maintaining Work-Life Balance

There are several key strategies to avoid the trap of over-commitment to the job at the expense of home life.

Manage Your Correspondence

- set a cadence for checking messages, e-mail, phone calls, and other business communications

Take Breaks

- the increased amount of available information makes it easy to get trapped in front of computer screens

Set Manageable Goals Each Day

- by establishing a plan for each day, managers can avoid the stress that occurs when a lack of planning forces them to constantly react to events in the workplace rather than working a plan

Guard Your Step

- the importance of sleep to brain development and memory formation cannot be overemphasized

MIS Data Analytics

Data analytics refers to interpreting the vast amounts of available data and translating this into effective decision making.

Being able to draw conclusions from data allows managers to maximize a business's potential.

Function	Advantages
Management information systems focus on creating algorithms that automate data gathering, data processing, and the communication of the interpreted data (information) so that actionable information reaches decision-makers as quickly as possible.	The effective use of data analytics can help organizations to avoid bottlenecks in logistics or workflow and can help to identify inefficiencies more quickly. In essence, data analytics allow organizations to constantly improve performance.

Employee Monitoring Technology

Employee monitoring software allows a network administrator to view all computer activity from a central location.

Purpose

- the purpose of the employee monitoring software is to collect performance data by tracking and digitizing employee computer use

Advantage and Disadvantage

- it has the advantage of allowing the administrator to physically monitor what is occurring with every computer
- it has the major disadvantage of being easily abused

Market Leaders

- Kickidler, Microsoft, and ActivTrak are three market leaders in the development of employee monitoring software

Video-Conferencing

Improved technology and increased Internet bandwidth have precipitated a vast increase in the use of **video-conferencing**.

Uses	**Examples**
Video-teleconferencing is used in the workplace for the following: •routine meetings •human resource interviews, training sessions •sales conferences	The simplest examples of video-teleconferencing include the use of apps such as Skype or FaceTime, while many businesses opt for the increased capability associated with video-teleconferencing systems and software included with products and services such as Zoom or WebEx.

Flextime: Benefits

Management information systems help facilitate the introduction of **flextime.**

Flextime refers to the increasingly common practice of allowing employees to better control their work schedules through flexible start and stop times or by virtual telecommute and teleconference.

- many corporations feel that task accomplishment is more important than physical presence during specific time periods, and that by allowing workers the flexibility to complete their duties when it best meets their schedules, employers can attract and retain a more motivated workforce

Flextime: Challenges

While offering flextime to employees provides several benefits, it also offers corporations some challenges.

- problem of scheduling events that require a physical presence. Presentations, training, and team-building exercises often require personal attendance that precludes the use of flextime

- care must be taken to ensure employees have a sense of work equity as well as fairness regarding contact with their superiors

For these reasons, a flextime policy must be well constructed prior to initiating.

Despite these issues, flextime will likely become increasingly popular as technological advances make it more and more practical.

Telecommuting

Management information systems and the improved accessibility to high-speed Internet makes telecommuting increasingly practical for many organizations.

Telecommuting refers to working from home, from outside of the office, or from other remote locations rather than traveling into a place of business to conduct work.

Telecommuting has many positive attributes.

- most employees appreciate the flexibility that telecommuting provides, just as many students prefer online classes to traditional face-to-face classes

- telecommuting can reduce traffic congestion and the associated pollution associated with regular commutes

Telecommuting (cont.)

Like online classes, however, telecommuting also has associated drawbacks.

- telecommuting demands increased personal discipline on the part of employees as there may be many distractions at home

- telecommuting often means working longer hours since employees are not limited to the office work schedule

- many telecommuters respond to e-mail and telephone calls long before and after regular working hours

- because management information systems allow many employees to work from remote locations, a vacation today often means just working from a prettier site

  - it is not unusual to see vacationing employees working from laptops near a beach or a ski resort

Green Computing and Sustainability

As businesses endeavor to reduce their impact on the environment, management information systems will likely play a large role in assisting managers to act in a more environmentally friendly manner.

Sustainable Business Practices

Impact Area	Description
Efficient Meetings	Advances in communication and collaboration have reduced the amount of travel required in order to hold efficient meetings.
Four-day Workweek	A recent study conducted by Microsoft in Japan showed that shifting to a four-day workweek improved employee morale, increased productivity, and decreased electricity (and paper) consumption throughout the business.
Travel	Many companies provide financial incentives to employees who carpool, use public transit, or bicycle or walk to work.

Changing MIS Technology Will Change How Managers Work

As MIS technology progresses, more and more systems will be available for small business owners, and there will be greater differentiation between organizations that capitalize on these advances and those that fail to do so.

Increase Ability to Collaborate

- businesses such as restaurants may continue the move to group server scheduling apps, where workers can sign up whenever they see gaps in service

  - this collaborative approach allows for more flex schedules

- more management services will be available online.

  - already, apps such as ZipRecruiter and Indeed have moved a significant amount of HR department duties to the Web

- businesses are increasingly using web services to replace IT departments and accounting departments, freeing up managers to focus more on production rather than support roles

Changing MIS Technology Will Change How Managers Work (cont.)

Increase Range of Services

- relatively simple applications, such as Square POS devices, will continue to expand services
  - already, the applications provide payroll, employee benefits, tax filing, and inventory services, along with the standard POS and sales reports services
  - it is easy to envision the incorporation of decision-making software into these applications

Increase in Ability to Conduct Business While Mobile

- as 5G service becomes more widely available, the ability to conduct business while mobile will also expand
  - this will allow many services, such as enterprise resource management tools, to be available while on the road
  - a downside of this eventuality is the potential loss of true vacation time, as businesses will expect in-house style availability and support from managers at all times

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