

Unit X: Future Trends in Management Information System - Management Information System

Future Trends in MIS:

Management information systems (MIS) are complex decision support systems used by companies to enhance and improve their business operations. Historically, an MIS was a management tool to help company management make informed decisions for their business based on information gathered from all business departments. Technology has greatly improved the effectiveness of the MIS.

Enterprise Resource Planning:

Enterprise resource planning (ERP) software is a form of MIS that is installed in all departments and locations of businesses to enhance the availability of company information.

With the globalization of the economic marketplace, companies have sought ways to improve their ability to collect and report financial information to management for effective decision making.

ERPs fill this void by allowing companies to use one computer system to effectively record all company information.

Benefits of Networking:

Another trend in MIS is the ability for companies to network with other companies for business purposes. Manufacturing firms can shorten their supply chain using electronic data interchange (EDI) to transfer the necessary information for ordering more products.

Networking also allows companies to transfer money through several bank accounts, creating a quicker process for paying bills and purchasing materials. An MIS ensures that management has all the pertinent information for these business operations, allowing them to review the effectiveness of their operations.

Data Mining, a Powerful Tool:

An important trend in MIS is the ability for companies to use data mining tools to collect information regarding consumer purchases and other economic trends. This allows

management to translate this information into goals and directions for future business operations.

Most MIS software also has trending or forecasting models that allow companies to project emerging consumer markets for profitable operations. Companies can use their internal figures in the MIS to measure the effectiveness of their external data mining techniques.

Educational Programs:

As MIS software becomes more prevalent in businesses, many colleges and universities have developed educational programs to train students on these programs.

Most degrees are four-year baccalaureate programs that combine general business courses with a mix of computer programming and management classes.

This helps students to develop a well-rounded education in the development and implantation of MIS software. Advanced degrees are also offered.

Careers in Database Management and Consulting:

Computerized MIS programs have led to a new career in database management and consulting. According to the U.S. Bureau of Labor Statistics (BLS), employment of computer and information technology occupations is projected to grow 13 percent from 2016 to 2026, faster than the average for all occupations.



Fig: Future Trends in Management Information System

Trend and Information:

1. Cloud Computing:

The practice of using a network of remote servers hosted on the Internet to store, manage, and process data. Cloud computing offers 3 types of broad services mainly Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).

Some of the advantages of Cloud computing are it reduces IT infrastructure cost of the company, promotes the concept of visualization, which enables server and storage device to be utilized across organization.

Cloud computing makes maintenance of software and hardware easier as installation is not required on each end user's computer. Cloud is the new style of elastically scalable, self-service computing, and both internal applications and external applications will be built on this new style.

While network and bandwidth costs may continue to favor apps that use the intelligence and storage of the client device effectively, coordination and management will be based in the cloud. Disadvantages of Cloud computing are issues concerning privacy, compliance, security, legal, abuse, IT governance.

Cloud computing is becoming the hub for operational infrastructure. Big data, generated through IoT, is an important driver for organizations to move to the cloud. The reason behind the movement to cloud-based operations are numerous, from IT agility to IT innovation and employee collaboration.

Technologies such as software-defined networking (SDN) and network functions visualization (NFV) are being looked into to give greater agility to cloud investments.

2. Artificial Intelligence:

According to a leading essay writing service, Artificial intelligence (AI) is definitely among the biggest hits when it comes to IT trends that have impacted creativity in the online space. AI can be manifested through different algorithms for machine learning.

This can be manifested not only in the amount of funding that AI receives but also the wide range of applications where it is being incorporated.

Instead of focusing on a single goal such as communicating with humans or mastering a certain game, AI has now started to get into new platforms, device or app and we will continue to see this trend accelerating in the future. This is why AI is a trend that will affect human resources development.

3.The Internet of Things (IoT):

Rapid increase in IoT solutions being deployed to advance business intelligence. ABI Research reported a 20% increase in IoT connected devices in 2014 from 2013. This year, Cisco predicts there will be 25 billion connected devices, which will double to 50 billion by 2020.

Information Age suggests IoT will revolutionize business by allowing companies to improve value propositions, engage with customers on levels previously unavailable and build entirely new revenue streams.

Investment in IoT has mainly come from the IT and telecoms industry, which will naturally benefit from the increase in data generated and application capabilities for mobile devices. In 2015, spectators predict investment in IoT will increase outside this industry.

The retail industry is one sector, in particular, that is looking to tap into sensor data generated via wearable technology to provide highly targeted products and services to their customers.

As businesses look to IoT technologies to provide more insight, there is an ever-increasing demand for analysts capable of transforming IoT data into actionable business intelligence. IoT will become the next critical focus for data and analytics services with IDC predicting 30% CAGR over the next five years.

4.Big Data:

Big data as a concept is ever-evolving as the capacity to mine structured, semi-structured and unstructured data increases. In 2014, organizations were making more informed business decisions and becoming more intelligent as they interact with their customers. More sophisticated 'recommendation engines' anticipating users' interests more accurately for services such as Netflix, Amazon and Google.

Further, credit reference agencies have been using big data to inform on lending decisions by developing the algorithms used to generate credit ratings. Retail, logistics and budget planning have all seen significant advancement last year due to greater business intelligence.

The increasing influx of data available to organizations will require the infrastructure being used to house, process, analyze and visualize intelligence to expand. The IDC predicts that rich media analytics will be the driver behind many big data projects, expecting this area to at least triple in size.

The increased demand for greater sophistication in analysis and data consumption will require organizations to refine talent acquisition strategies to compete in the skills gap.

5.Increased Automation.

There is no escape that people costs continue to be a big part of total IT costs.

The use of cloud services will continue to reduce this (with cloud service providers achieving lower costs through both economies of scale and the use of automation) but there is still a need to reduce human touch points and the associated costs, within corporate data centers and operational environments – with speedier delivery and fewer human errors secondary benefits.

2015 will see even greater automation adoption by corporate IT organizations under pressure to reduce costs and better demonstrate business value.

6.Continued Mobile Pervasiveness:

Continued improvements in anytime, anywhere, any device access to data and services will continue to drive the need for better mobile apps and experiences, and the use of personal devices for work purposes.

Not only will this dictate the need for better service and app design and delivery, and more intelligent approaches to BYOD, but also the need to consider the security implications of mobility such as data segregation issues – with personal and business data and applications isolated from each other on the same device.

7.Context-Rich Systems:

Ubiquitous embedded intelligence combined with pervasive analytics will drive the development of systems that are alert to their surroundings and able to respond appropriately.

Context-aware security is an early application of this new capability, but others will emerge. By understanding the context of a user request, applications can not only adjust their security response but also adjust how information is delivered to the user, greatly simplifying an increasingly complex computing world.

8.Web-Scale IT:

Web-scale IT is a pattern of global-class computing that delivers the capabilities of large cloud service providers within an enterprise IT setting. More organizations will begin thinking, acting and building applications and infrastructure like Web giants such as Amazon, Google and Facebook.

Web-scale IT does not happen immediately but will evolve over time as commercial hardware platforms embrace the new models and cloud-optimized and software-defined approaches reach the mainstream.

The first step toward the Web-scale IT future for many organizations should be DevOps, bringing development and operations together in a coordinated way to drive rapid, continuous incremental development of applications and services.

9.3D Printing:

Worldwide shipments of 3D printers are expected to grow 98 percent in 2015, followed by a doubling of unit shipments in 2016. 3D printing will reach a tipping point over the next three years as the market for relatively low-cost 3D printing devices continues to grow rapidly and industrial use expands significantly.

New industrial, biomedical and consumer applications will continue to demonstrate that 3D printing is a real, viable and cost-effective means to reduce costs through improved designs, streamlined prototyping and short-run manufacturing.

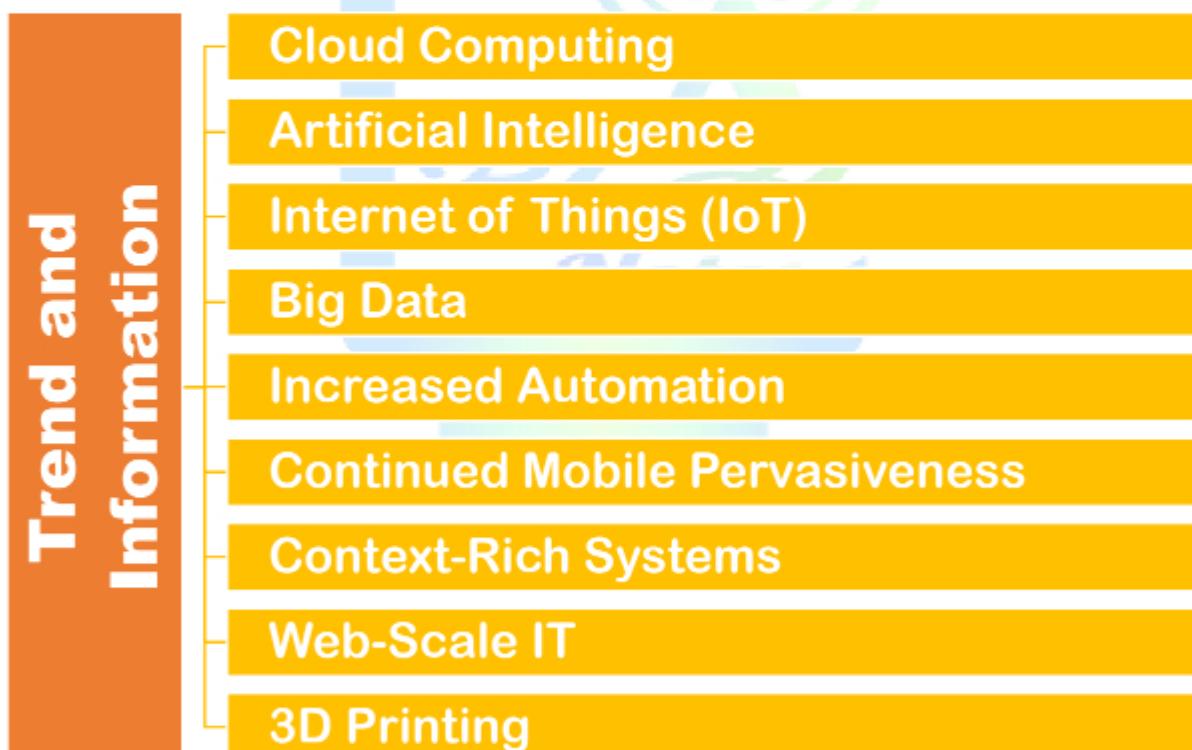


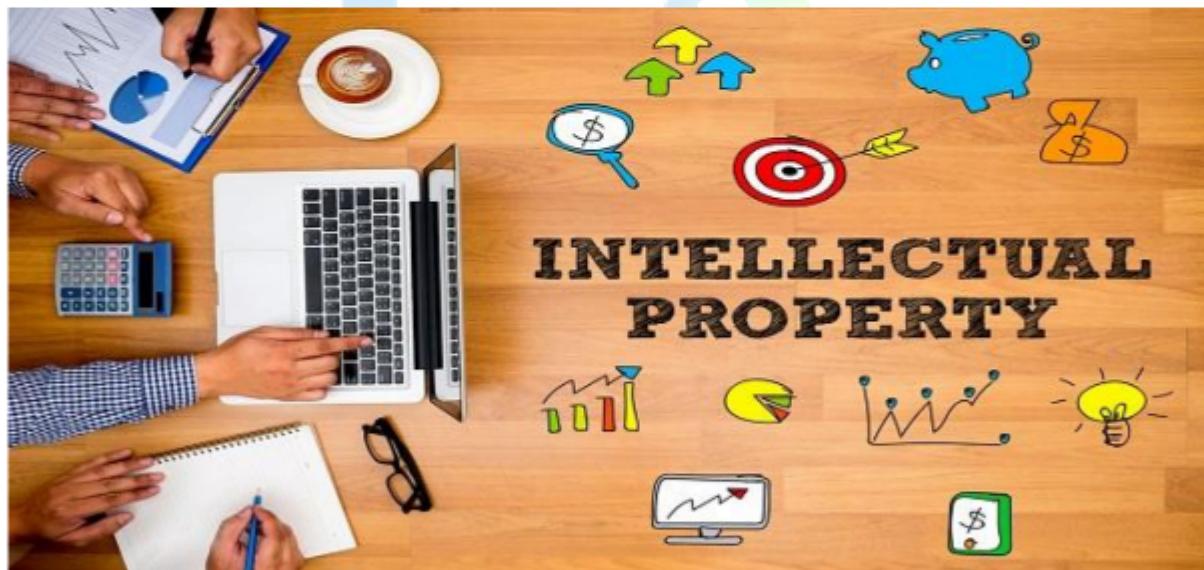
Fig: Trends and Information

Intellectual Computing (Speech Recognition, Decision Making):

Intellectual property rights are the legal rights that cover the privileges given to individuals who are the owners and inventors of a work, and have created something with their intellectual creativity. Individuals related to areas such as literature, music, invention, etc. can be granted such rights, which can then be used in the business practices by them.

The creator/inventor gets exclusive rights against any misuse or use of work without his/her prior information. However, the rights are granted for a limited period of time to maintain equilibrium. The following list of activities which are covered by the intellectual property rights are listed down by the World Intellectual Property Organization (WIPO):

- a. Industrial designs
- b. Scientific discoveries
- c. Protection against unfair competition
- d. Literary, artistic, and scientific works
- e. Inventions in all fields of human endeavor
- f. Performances of performing artists, phonograms and broadcasts
- g. Trademarks, service marks, commercial names and designations



Advantages:

- a. Provides exclusive rights to the creators or inventors.
- b. Encourages individuals to distribute and share information and data instead of keeping it confidential.
- c. Provides legal defense and offers the creators the incentive of their work.
- d. Helps in social and financial development.

Types of Intellectual Property:

Any tangible or intangible product from the human brain is intellectual property. All intellectual property needs protection. There are three main types of intellectual property protection:

1. Copyright:

Copyright is ownership of an original work created by another. It protects the form of expression such as writing, art, drawings, photographs, music, motion picture and performance and computer program being copied by others for a minimum of 50 years without the permission of the creator. It does not protect ideas, only protects expression of ideas combined with methods.

2. Patent:

A patent grants the owner an exclusive monopoly to the ideas behind an invention for 20 years. Patents are very different from copyrights in that they protect the ideas themselves and not merely the expression of ideas.

In order to be granted a patent, the applicant must show that the invention is new, original, non-obvious and not evident in prior arts and practice.

3. Trademark:

A trademark is a word, name, symbol, or device that is used in trade with goods to indicate the source of the goods and to distinguish them from the goods of others. The trademark law is twofold.

First, trademark law protects the public in the marketplace by ensuring that it gets what it pays for and wants to receive. Second, trademark law protects the owner who has spent time, money and energy bringing the product to market against piracy and misappropriation.

Speech Recognition:

Speech recognition is the ability of a machine or program to identify words and phrases in spoken language and convert them to a machine-readable format.

Rudimentary speech recognition software has a limited vocabulary of words and phrases, and it may only identify these if they are spoken very clearly. More sophisticated software has the ability to accept natural speech.

How It Works:

Speech recognition works using algorithms through acoustic and language modelling. Acoustic modelling represents the relationship between linguistic units of speech and audio signals; language modelling matches sounds with word sequences to help distinguish between words that sound similar.

Often, hidden Markov models are used as well to recognize temporal patterns in speech to improve accuracy within the system.

Applications:

The most frequent applications of speech recognition within the enterprise include call routing, speech-to-text processing, and voice dialing and voice search.

Pros and Cons:

While convenient, speech recognition technology still has a few issues to work through, as it is continuously developed. The pros of speech recognition software are it is easy to use and readily available. Speech recognition software is now frequently installed in computers and mobile devices, allowing for easy access.

The downside of speech recognition includes its inability to capture words due to variations of pronunciation, its lack of support for most languages outside of English and its inability to sort through background noise. These factors can lead to inaccuracies.

Decision Making:

Decision-making is an integral part of modern management. Essentially, rational or sound decision making is taken as a primary function of management. Every manager takes hundreds and hundreds of decisions subconsciously or consciously making it as the key component in the role of a manager.

Decisions play important roles as they determine both organizational and managerial activities. A decision can be defined as a course of action purposely chosen from a set of alternatives to achieve organizational or managerial objectives or goals.

Decision-making process is continuous and indispensable component of managing any organization or business activities. Decisions are made to sustain the activities of all business activities and organizational functioning.

Decisions are made at every level of management to ensure organizational or business goals are achieved. Further, the decisions make up one of the core functional values that every organization adopts and implements to ensure optimum growth and drivability in terms of services and or products offered.

A lot of time is consumed while decisions are taken. In a management setting, decision cannot be taken abruptly. It should follow the steps such as:

1. Defining the problem
2. Gathering information and collecting data
3. Developing and weighing the options
4. Choosing the best possible option
5. Plan and execute
6. Take follow up action

Since the decision-making process follows the above sequential steps, a lot of time is spent in this process. This is the case with every decision taken to solve management and administrative problems in a business setting. Though the whole process is time-consuming, the result of such a process in a professional organization is magnanimous.

Technology and Mobility:

Technology:

Technology is the sum of techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation.

Technology can be the knowledge of techniques, processes, and the like, or it can be embedded in machines to allow for operation without detailed knowledge of their workings.

Systems (e.g. machines) applying technology by taking an input, changing it according to the system's use, and then producing an outcome are referred to as technology systems or technological systems.

Technology has many effects. It has helped develop more advanced economies (including today's global economy) and has allowed the rise of a leisure class. Many technological processes produce unwanted by-products known as pollution and deplete natural resources to the detriment of Earth's environment.

Innovations have always influenced the values of a society and raised new questions in the ethics of technology. Examples include the rise of the notion of efficiency in terms of human productivity, and the challenges of bioethics.

Philosophical debates have arisen over the use of technology, with disagreements over whether technology improves the human condition or worsens it.

Technology Challenges:

Although technology is undoubtedly making our lives easier, the ease of access to shared information presents a wide range of legal implications for businesses.



1. Data Security:

Data security concerns posed by advances in technology and the manner in which consumers, businesses and other organizations use that technology will be a significant concern in the year ahead.

Data-related issues permeate virtually all evolving technologies. With huge amounts of business and personal data transmitted and stored electronically, the opportunities for data breaches are dramatically increased and businesses must anticipate quick responses to satisfy a patchwork of state and federal data breach regulations.

While those regulations continue to raise the standards for data security practices, contracting parties also expect greater accountability for these standards. Enhanced encryption and biometrics may also provide solutions for some of these problems.

2. Big Data:

By one estimate, computer and device users create over 2.5 quintillion bytes of data daily! This is the world of Big Data. Technologies to analyze, use, and, in some cases, commercialize such vast amounts of data are beginning to be more widely deployed.

However, the significant productivity gains and commercial opportunities are offset by serious security concerns and encroachments on privacy. Major issues will include who should control and be compensated for such data.

3. Cloud Computing:

Cloud computing continues to show great promise for major cost savings for businesses and convenience for consumers. Yet, as more software applications and other computing

resources are hosted and accessed online in the “cloud,” data privacy and security risks are increasing, and contracting and licensing norms are evolving and becoming more difficult to manage.

4. Open Source Software:

Non-proprietary open-source software applications offer many benefits and costs savings, but compliance with open source license terms can be tricky. If not handled properly, the use of open-source software can compromise ownership of the company software and jeopardize acquisitions and other significant business transactions.

5. Mobile Payments:

Several consumer surveys suggest that we keep better track of our mobile devices than we do of our wallets, so the rapid spread of mobile payments is no surprise. However, liability issues remain to be worked out for many transactions – misdirected payments, unauthorized access and account balance mistakes, among others – that may not go as intended.

6. Social Media Related Liabilities:

Widespread business use of social media tools means that companies must maintain and communicate clear policies of acceptable practices and ensure compliance with applicable terms.

Many legal pitfalls exist, including running afoul of state-level sweepstakes regulations with online promotions; failure to comply with relevant FTC guidelines when using social media for online marketing programs; inadvertent infringements of third-party intellectual property rights when posting content; and contract breaches because of noncompliance with social media platform rules.

7. Wearable Computing:

Google Glass, computer watches (more elaborate than what Dick Tracy might have imagined) and other wearable computing devices push the boundary of mobile computing even further than the still recent wonders of smartphones and tablets.

The tie-in of these devices with biometric monitoring, access and control offers potential conveniences while also presenting additional risks.

The privacy, security and liability issues with such devices will likely dwarf the similar concerns (e.g., texting while driving) raised by our non-wearable mobile appendages.

8. The Internet Of Things:

Electronic tagging and tracking of objects and people with bar codes, RFID devices and other technologies and communicating the resulting data about locations, movements and status – the so-called “Internet of Things” – is on the cusp of becoming a reality.

While this technology may offer many benefits to businesses and consumers, the privacy issues posed by the Internet of Things are similar to the issues surrounding “Big Data.”

9. Virtual Currencies:

Offering convenience for many online transactions, virtual currencies (such as Bitcoin) fill a growing marketplace niche. However, unlike sovereign currencies, which are subject to varying degrees of regulation, virtual currencies do not fit neatly into existing legal frameworks.

In addition, this fact has not gone unnoticed by criminal elements and provides another reason that mainstream consumers and businesses are wary about the acceptability of digital currencies.

10. Remote Automation And Control:

The remotely automated, controlled and monitored “smart office” and “smart home” – even smart cities – are now a reality. However, a close look at the fine print about responsibility for accidents and mistakes reveals that disclaimers abound.

Still to be sorted out is where the balance of liability will ultimately rest between providers and users of these automation and monitoring technologies.

Mobility:

Mobile technology has revolutionized the way we live, play and work. Consumer mobility trends have taken the enterprise by storm. Most employees use their mobile devices for work-related purposes throughout the workweek and frequently during the weekend.

More and more businesses, educational institutions and healthcare organizations are investing large percentages of their IT budgets on mobility initiatives.

Organizations may choose to provide mobile devices, which costs more but provides high levels of control and security, or institute **Bring Your Own Device** (BYOD) programs, which are cost-effective but more complex to administer.

Whichever model they choose, organizations must develop solutions for such challenges as device management, end-user experience, mobile applications, scaling and security.



Fig: Mobile Technology

Anytime, Anywhere Access Improves Productivity:

Some of the benefits of secure access to corporate applications and data from anywhere are:

- a. Employees can work and communicate more flexibly and efficiently.
- b. Teachers and students can collaborate with each other and access learning resource while off-campus.
- c. Healthcare providers review patient data and images from their home offices.

More flexible work models make it easier to access the data, applications, tools and people that employees need to do their jobs from any location, increasing their productivity and reducing the amount of downtime due to weather emergencies, public transit problems or other events that might keep them out of the office.

Mobility provides field workers with secure access to applications and databases, allowing them to eliminate trips back and forth to the office and duplicate data entry tasks. The ability to work from any location increases connection to the employer and improves both retention and recruitment.

Complex Deployments, Easy-to-Use Tools:

The benefits of mobility come with challenges and risks; mobile devices and programs are more complex to deploy and manage than familiar wired technologies and environments.

Enterprise mobility flips the traditional top-down model of enterprise IT control on its head, transferring much of the control of devices, apps and services to the end-user and in the process, creating new security and management challenges.

Security and management tools help organizations rise to the challenge. Virtual private network (VPN) access ensures the security of data transmissions and other network transactions and allows organizations to track and monitor network traffic.

Easy-to-use mobile management tools for employer-provided or employee-owned devices provide centralized and remote management, monitoring and security for all types of mobile devices, applications and at-rest or in-transit data.

For example, they can be used to lock down or wipe a stolen or lost device, provide role-based access to data and applications, troubleshoot device or application problems and upgrade software and operating systems.

Enterprise mobility involves more than handing out devices and deploying applications. Proper planning and implementation involves assessing and fine-tuning technology architectures, software platforms and back-end applications and databases.



