# Unit-5 **Emerging Technologies in Information Technology**



- Cloud and Mobile computing
- E-Commerce
- M-Commerce
- E-Business
- Electronic Data Interchange
- Digital Payment
- Digital future and MIS role
- Augmented Reality
- Digital Marketing
- Cashless Transactions and pitfall
- Start-up (ED-TECH)

# **Cloud and Mobile Computing**

# **Cloud Computing**

- ▶ Cloud computing is the delivery of on-demand computing services over the internet on a payas-you-go basis.
- To put it in simple terms, cloud computing allows you to manage files and services over the internet with remote servers rather than a local server or personal computer.
- Modern businesses are continually moving more of their operations into the cloud to support a more scalable, cost-effective environment.
- ▶ Cloud Computing and Mobile Computing have reshaped the digital landscape, offering diverse applications.



#### **Examples of Cloud Computing**

- Storing files on services like Google Drive or Dropbox
- Using online productivity tools like Google Docs or Office 365
- Using cloud-based email services like Gmail or Outlook.com

# **Benefits of Cloud Computing**

- ▶ Reduced IT costs
  - → Moving to cloud computing might reduce the cost of managing and maintaining your IT systems. Instead of purchasing expensive systems and equipment for your business, you can reduce costs with the resources of a cloud computing service provider.
- Scalability
  - → With a cloud computing service, you only pay for what you need. You can scale your storage up or down based on your needs.
- Server Storage
  - → By taking advantage of a cloud service provider, you're saving space on your own server.

# **Benefits of Cloud Computing**

- Data Security
  - → Cloud service providers are typically more secure than a local server or your own personal computer. Therefore, cloud computing helps protect your company's sensitive data from being corrupted or lost.

# **Mobile Computing**

- If you used your smartphone today, you relied on mobile computing. Mobile computing refers to different devices that allow people to access data and information from any location.
- Mobile computing carries data, voice, and video over a network through a mobile device. These devices rely on a core operating system which supports various software applications.
  - → There are several examples of mobile computing, such as:
    - Smartphones and cell phones
    - Laptops
    - Tablets
    - Bluetooth devices
    - E-book readers
    - Handheld game consoles
    - Cameras

### **Examples of Mobile Computing**

- Using mobile apps for banking, shopping, or social media
- Accessing emails and files on smartphones or tablets
- Using GPS navigation services on mobile devices



# **Benefits of Mobile Computing**

- In our fast-paced digital world, mobile computing provides a lot of benefits. Mobile computing facilitates digital communication on the go.
- It connects people to needed information at all times, all over the globe.
- ▶ Just as with cloud computing, it's important to keep your company mobile devices safe to ensure that the data shared and stored on them doesn't get lost or stolen.
- Information security services for your business's mobile devices can protect your data from threat actors.



Difference Area	Cloud Computing	Mobile Computing
Accessibility	Accessible from any internet- connected device	Accessible only through the specific mobile device
Storage	Large storage capacity on remote servers	Limited storage capacity on the mobile device
Connectivity	Requires an internet connection	Can work offline with some limited functionality
Processing Power	Relies on remote servers for processing power	Relies on the limited processing power of the mobile device
Cost	Typically pay-as-you-go or subscription-based	Upfront cost for the mobile device and occasional app purchases

Customization	Can be tailored to specific needs and preferences	Less customizable compared to desktop computers
Security	Relies on the security measures implemented by the cloud provider	May face higher security risks due to lost or stolen devices
Software Updates	Updates are managed by the cloud provider	User needs to update the mobile device's software manually
Network Requirements	Requires a stable internet connection for optimal performance	Can operate on various networks like Wi-Fi, cellular, or Bluetooth
Compatibility	Compatible with multiple devices and operating systems	Compatibility is limited to the operating system of the mobile device

# E-commerce and M-commerce

#### E-commerce and M-commerce

- ▶ E-commerce, or electronic commerce, refers to the buying and selling of goods and services online using the Internet.
- M-commerce, or mobile commerce, is a subset of ecommerce that refers specifically to transactions conducted using mobile devices, such as smartphones and tablets.
- M-commerce includes not only online purchases made through mobile devices, but also mobile payments, mobile banking, and other transactions facilitated by mobile technology.
- ▶ They offer numerous benefits, including convenience, flexibility, and access to a wider range of products and services. However, they also present new challenges and risks, such as security concerns and the need to adapt to changing technology and consumer preferences.





#### **E-commerce**

- ▶ Electronic Commerce in short it is called as e-commerce.
- In general, e-commerce activities are performed with the help of desktop computers and laptops.
- ▶ E-commerce is an older concept.
- It is broad term that refers to doing shopping and making payments online with the help of electronic devices like Laptops and computers.
- In e-commerce the use of the internet is mandatory.
- E-commerce devices are not easy to carry and the portability point of view it is not so good.



#### **E-commerce**

- ▶ E-commerce developed in 1970s.
- Its reachability is comparatively low than the m-commerce as it is not so good in portability.
- In e-commerce location tracking capabilities are limited due to the non-portability of devices.
- E-commerce is conducted using desktop or laptop computers.
- ▶ E-commerce typically requires a stable internet connection and a computer.
- ▶ E-commerce transactions typically rely on credit cards and other traditional payment methods.
- Examples of E-commerce includes Amazon, Flipkart, Quikr, Olx websites.



#### **M-commerce**

- Mobile Commerce in short it is called as m-commerce.
- M-commerce activities are performed with the help of mobile devices like smartphones, tablets, PDA's (Personal Digital Assistant) etc.
- ▶ M-commerce is an newer concept.
- It is subcategory of ecommerce which does the same this via mobile devices.
- ▶ M-commerce devices are easy to carry and portability point of view it is good.
- ▶ M-commerce developed in 1990's.
- Its reachability is more than that of e-commerce only due to the use of mobile devices.



#### **M-commerce**

- In m-commerce location tracking capabilities is so good as mobile apps track and identify user locations with the help of GPS technology, Wi-Fi, and so on.
- ▶ M-commerce is conducted using mobile devices such as smartphones and tablets.
- ▶ M-commerce allows consumers to shop and make purchases from anywhere.
- M-commerce offers a wider range of payment options, including mobile wallets and contactless payments.
- Examples of M-commerce includes mobile banking like paytm, in-app purchasing Amazon mobile app.



# E-business

#### **E-business**

- ▶ E-business (electronic business) is any process that a business organization conducts over a computer-mediated network. Business organizations include any for-profit, governmental, or nonprofit entity.
- ▶ Their processes include production-, customer-, and internal- or management-focused business processes.
- ▶ E-business is similar to e-commerce but encompasses much more than online purchasing transactions.
- ▶ Functions and services range from the development of intranets and extranets to the provision of e-services over the internet by application service providers.
- ▶ Enterprises conduct e-business to buy parts and supplies from other companies, collaborate on sales promotions and conduct joint research.

#### **E-business**

- ▶ Corporations are continuously rethinking and reshaping their business models influenced by advanced technologies, hybrid workforces, heightened customer expectations and, specifically, the internet's availability, reach and ever-changing capabilities.
- ▶ The growth of e-business in recent decades has given rise to new business requirements.
- ▶ Cybersecurity has become ingrained in e-business with deployments of endpoint device security and advance detection and response capabilities.

# **E-business Model Origins and Evolution**

- ▶ IBM was one of the first companies to use the term e-business in October 1997, when it launched a thematic campaign to address the confusion many consumers had about internet-based businesses.
- The company spent approximately \$500 million on an advertising and marketing campaign to show the value of the e-business model and to demonstrate that IBM had the "talent, the services and the products to help customers capture the benefits of this new way of doing business," according to the company's website. By 2000, IBM's e-business revenue had grown to more than \$88 billion from \$64 billion in 1994, and net income had nearly tripled.

## Different types of e-business models

# Business-to-consumer (B2C) model

 Sellers offer products and services directly to consumers online, and the buyer purchases them via the internet.

# Business-to-business (B2B) model

 Companies use the internet to conduct transactions with one another. Unlike B2C transactions, B2B transactions usually involve multiple online transactions at each step of the supply chain.

# Consumer-to-business (C2B) model

Consumers create
their own value and
demand for goods
and services.
Examples include
reverse online
auctions and airline
ticket websites such
as Priceline and
Expedia.

# Consumer-to-consumer (C2C) model

 Consumers are buyers and sellers via third-party-facilitated online marketplaces such as eBay. These models generate revenue through personal ad fees, charges for memberships and subscriptions, and transaction fees.

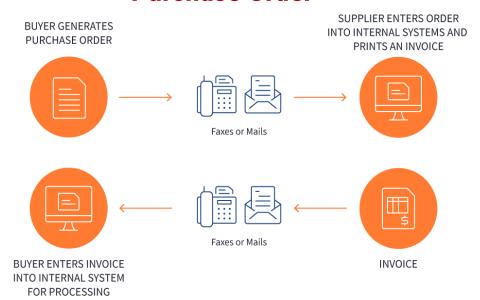
# **Challenges of e-business**

- Securing e-business services against increasingly sophisticated cyber threats.
- Scaling services fast enough to meet demand without jeopardizing performance.
- ▶ Evolving technologies fast enough to keep pace with changing market dynamics.
- Finding and training skilled workers to keep pace with advanced technologies.
- ▶ Keeping pace with e-business capabilities that, by their electronic nature, are always on.

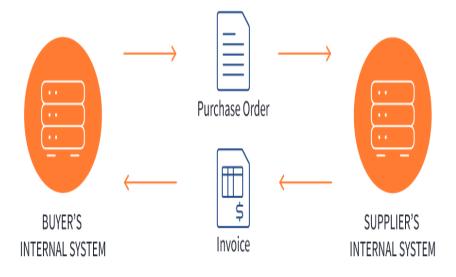
#### E-business vs. e-commerce

- ▶ E-commerce and e-business are similar but not synonymous.
- ▶ E-commerce narrowly refers to buying and selling products online, whereas e-business defines a wider range of business processes, including supply chain management, electronic order processing and customer relationship management, designed to help companies operate more effectively and efficiently.
- ▶ E-commerce therefore should be considered a subset of e-business.

#### A Traditional Document Exchange of a Purchase Order



#### An EDI Document Exchange of a Purchase Order



The traditional invoice illustrates what this can mean. Most companies create invoices using a computer system, print a paper copy of the invoice and mail it to the customer. Upon receipt, the customer frequently marks up the invoice and enters it into its own computer system. The entire process is nothing more than the transfer of information from the seller's computer to the customer's computer. EDI makes it possible to minimize or even eliminate the manual steps involved in this transfer.

- ▶ Electronic Data Interchange (EDI) is the electronic interchange of business information using a standardized format; a process that allows one company to send information to another company electronically rather than with paper.
- Business entities conducting business electronically are called trading partners.
- Many business documents can be exchanged using EDI, but the two most common are purchase orders and invoices.
- ▶ At a minimum, EDI replaces the mail preparation and handling associated with traditional business communication.
- ▶ However, the real power of EDI is that it standardizes the information communicated in business documents, which makes possible a "paperless" exchange.

- ▶ This process normally occurs overnight and can take less than an hour.
- Buyer makes a buying decision, creates the purchase order but does not print it.
- ▶ EDI software creates an electronic version of the purchase order and transmits it automatically to the supplier.
- Supplier's order entry system receives the purchase order and updates the system immediately on receipt.
- Supplier's order entry system creates an acknowledgment and transmits it back to confirm receipt.
- ▶ EDI documents must be processed by computers rather than humans, a standard format must be used so that the computer will be able to read and understand the documents.
- ► There are several EDI standards in use today, including ANSI, EDIFACT, TRADACOMS, and ebXML.

# **Digital Payment**

# **Digital Payment**

- Digital payments are payments done through digital or online modes, with no exchange of hard cash being involved.
- Such a payment, sometimes also called an electronic payment (e-payment), is the transfer of value from one payment account to another where both the payer and the payee use a digital device such as a mobile phone, computer, or a credit, debit, or prepaid card.
- A digital payment transaction can happen both on the internet and in person to the payee.
  - For example, if a buyer pays via UPI on an e-commerce website or buys from his local grocer and pays him through UPI while purchasing at the store, both are digital payment transactions.



#### Banking Cards

→ Indians widely use Banking cards, or debit/credit cards, or prepaid cards, as an alternative to cash payments. Andhra Bank launched the first credit card in India in 1981.

#### Unstructured Supplementary Service Data(USSD)

→ USSD was launched for those sections of India's population which don't have access to proper banking and internet facilities. Under USSD, mobile banking transactions are possible without an internet connection by simply dialing \*99# on any essential feature phone.

#### ▶ Aadhaar Enabled Payment System (AEPS)

→ AEPS is a bank-led model for digital payments that was initiated to leverage the presence and reach of Aadhar. Under this system, customers can use their Aadhaar-linked accounts to transfer money between two Aadhaar linked Bank Accounts.

#### Unified Payments Interface (UPI)

→ UPI is a payment system that culminates numerous bank accounts into a single application, allowing the transfer of money easily between any two parties. As compared to NEFT, RTGS, and IMPS, UPI is far more well-defined and standardized across banks.

#### Mobile Wallets

- Mobile Wallets, as the name suggests, are a type of wallet in which you can carry cash but in a digital format.
- → Some popularly used ones include Paytm, Freecharge, Mobikwik, mRupee, Vodafone M-Pesa, Airtel Money, Jio Money, SBI Buddy, Vodafone M-Pesa, Axis Bank Lime, ICICI Pockets, etc.

#### **▶** PoS Terminals

- → PoS(Point of Sale) is known as the location or segment where a sale happens.
- → The most common type of PoS machine is for Debit and Credit cards, where customers can make payment by simply swiping the card and entering the PIN.

#### **▶** Internet Banking

- → Internet Banking, also known as e-banking or online banking, allows the customers of a particular bank to make transactions and conduct other financial activities via the bank's website.
- ➡ Every payment gateway in India has a virtual banking option available. NEFT, RTGS, or IMPS are some of the top ways to make transactions via internet banking.

#### Mobile Banking

- → Mobile banking refers to the act of conducting transactions and other banking activities via mobile devices, typically through the bank's mobile app.
- → Mobile banking is known as the future of banking, thanks to its ease, convenience, and speed. Digital payment methods, such as IMPS, NEFT, RTGS, IMPS, investments, bank statements, bill payments, etc., are available on a single platform in mobile banking apps.

#### Micro ATMs

→ Micro ATM is a device for Business Correspondents (BC) to deliver essential banking services to customers. These Correspondents, who could even be a local store owner, will serve as a 'micro ATM' to conduct instant transactions. They will use a device that will let you transfer money via your Aadhaar-linked bank account by merely authenticating your fingerprint.

# **Benefits of Digital Payments**

# Ease and convenience

#### **Economic progress**

Safety and efficient tracking

- One of the most significant advantages of digital payment is the seamless experience they provide to customers. Reduced dependency on cash, fast transfer speed, and the ease of transacting make online payments a preferred option.
- More and more people feel comfortable buying online, investing digitally, and transferring funds via electronic mediums. The increase in money movement and online business contributes to the progress of the economy. This is why online ventures are being launched every day and even more are making profits daily.
- With digital payments, one can keep their funds secured in online format effortlessly. Nowadays, your mobile phone alone is enough to make and receive payments – thanks to UPI, netbanking, and mobile wallets.

# **Digital Future and MIS Role**

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- ▶ With digital payments, one can keep their funds secured in an online format effortlessly. Nowadays, your mobile phone alone is enough to make and receive payments thanks to UPI, netbanking, and mobile wallets.
- ▶ Currently, management information systems professionals focus on the use of enterprise resource planning systems to provide a centralized repository of business information to help business professionals make intelligent decisions faster.
- ▶ There is also an increase in the use of business analytics tools to help extract useful information from business data to make better decisions.
- ▶ With increased investment in emerging technologies like artificial intelligence and blockchain technologies, the future of MIS will focus on automating business decisions and processes, and gaining even deeper insight from business data.

## **Digital Future and MIS Role**

- ▶ MIS professionals will help to lead the next industrial revolution to utilize artificial intelligence, blockchains, robotics, quantum computing, and other technologies to help organizations compete, open new markets, and reduce the costs of business operations.
  - → For example, MIS professionals will work with accountants to automate accounting audits to create continuous audits.
  - → They will assist marketing professionals identify the best marketing strategies based on marketing and customer data.
  - → They will help financial firms make better investment decisions through the use of artificial intelligence and other data-focused technologies.
- ▶ The possibilities for MIS professionals are broad and needed to support digital transformations within organizations globally.

# **Augmented Reality**

# **Augmented Reality**

- ▶ Augmented reality (AR) is an enhanced version of the real world, achieved through the use of computer-generated digital information.
- ► These include visual, sound, and other sensory elements.
- AR uses computer hardware and software, such as apps, consoles, screens, or projections, to combine digital information with the real-world environment.
- Retailers and other companies can use augmented reality to promote products or services, launch novel marketing campaigns, and collect unique user data.

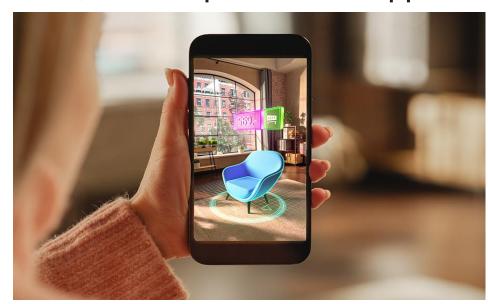


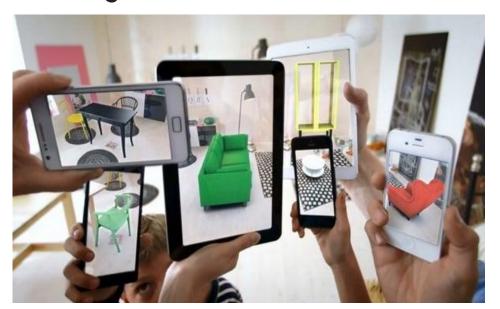
# What Is Augmented Reality Used for?

- ▶ Augmented reality either makes visual changes to a natural environment or enhances that environment by adding new information.
- It can be used for various purposes, including gaming, product visualization, marketing campaigns, architecture and home design, education, and industrial manufacturing.

# **Examples of Augmented Reality**

- ▶ Some early adopters in the retail sector have developed AR technologies designed to enhance the consumer shopping experience.
- Augmented reality has been incorporated into store catalog apps, which allows consumers to visualize what different products would look like in different environments.
  - → For example, when buying furniture, shoppers point the camera to the appropriate room, and the product will appear in the foreground.





# **Examples of Augmented Reality**

- ▶ Augmented reality's benefits can also extend to the healthcare sector, where it can play a much bigger role.
- ▶ AR apps enable users to see highly detailed, 3D images of different body systems when they hover mobile devices over a target image.
- ▶ This use of AR has become a powerful learning tool for training medical professionals.





# **Advantages of Augmented Reality**

- ▶ Augmented reality is an interactive experience in which a real-world environment is enhanced with computer-generated visual elements, sounds, and other stimuli.
- It can provide a user with a heightened, more immersive experience than they would experience otherwise, which adds to the user's enjoyment or understanding.
- ▶ From a commercial perspective, augmented reality can increase brand awareness and boost sales.

# **Digital Marketing**

# **Digital Marketing**

- Digital marketing is the promotion and marketing of goods and services to consumers through digital channels and electronic technologies.
- These digital channels can include the internet, mobile devices, social media platforms, webinars, search engines, online customer communities and other digital platforms.
- Digital marketing also includes a range of approaches and tactics to reach and persuade the target audience through digital media, including email marketing, social media marketing, search engine optimization (SEO), content marketing and online advertising.



## Website Marketing

→ Companies often use their website as the centerpiece of their digital marketing activities. The most effective websites represent the brand and its products and services in a clear and memorable way. A website today must be fast-loading, mobile-friendly, and easy to navigate.

## Pay-Per-Click Advertising

- → Pay-per-click (PPC) advertising enables marketers to reach audiences on news and other websites and digital platforms through paid ads. Marketers can set up PPC campaigns on Google, Bing, LinkedIn, X (formerly Twitter), Pinterest, and Facebook and show their ads to people searching terms related to their products or services.
- These campaigns can segment users based on their demographic characteristics (such as age or gender), or their particular interests or location. The most widely used services for PPC are Google Ads and Facebook Ads.clearly and memorably

## Content Marketing

→ The goal of content marketing is to reach potential customers through the use of written, visual, or video content that interests them. That content is usually published on a website and then promoted through social media, email marketing, search engine optimization, or even pay-per-click campaigns. Content marketing attempts to be more subtle than advertising, and the product or service the sponsor is attempting to market may or may not be conspicuously highlighted.

## **▶** Email Marketing

→ Email marketing is still one of the most effective digital marketing channels, though many people associate it with spam and treat such messages accordingly. Many digital marketers use their other digital marketing channels to collect names for their email lists. Then, through email marketing, they try to turn those leads into customers.

## Social Media Marketing

The primary goals of a social media marketing campaign are to build brand awareness and establish trust. As you go deeper into social media marketing, you can use it to obtain leads and as a direct marketing or sales channel. Promoted posts and tweets are two examples of social media marketing.

### **▶** Affiliate Marketing

→ Affiliate marketing is one of the oldest forms of marketing, and the digital world has given it new life. In affiliate marketing, companies and individual "influencers" promote another company's products and get a commission every time a sale is made or a fresh lead is added to their list. Many well-known companies, including Amazon, have affiliate programs that pay out millions of dollars to affiliates that help sell their products.

## Video Marketing

→ A lot of internet users turn to sites like YouTube before making a buying decision, to learn how to do something, to read a review, or just to relax. Marketers can use any of several video marketing platforms, including Facebook Videos, Instagram, and TikTok, to run a video marketing campaign.

### ► Text Messaging

→ Companies also use text messages (formally known as SMS, or short message service) to send information about their latest products and promotions.

# **Key Performance Indicators (KPIs) in Digital Marketing**

Digital marketers use key performance indicators (KPIs) just like traditional marketers. KPIs let them measure the long-term performance of their marketing initiatives and compare those to their competitors' efforts.

### Click-through rate

→ This KPI is commonly used to measure the effectiveness of online advertising, by counting the number of people who clicked on a particular ad as a percentage of all the people who might have seen it.

#### Conversion rate

→ The conversion rate goes even further than the click-through rate to compare the percentage of people who took some desired action, such as making a purchase, to the total audience that a particular ad or promotion reached.

# **Key Performance Indicators (KPIs) in Digital Marketing**

## **Click-through rate**

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 The conversion rate goes even further than the click-through rate to compare the percentage of people who took some desired action, such as making a purchase, to the total audience that a particular ad or promotion reached.

#### Social media traffic

This tracks how many people interact with a company's social media profiles. It includes likes, follows, views, shares, and/or other measurable actions.

#### **Website traffic**

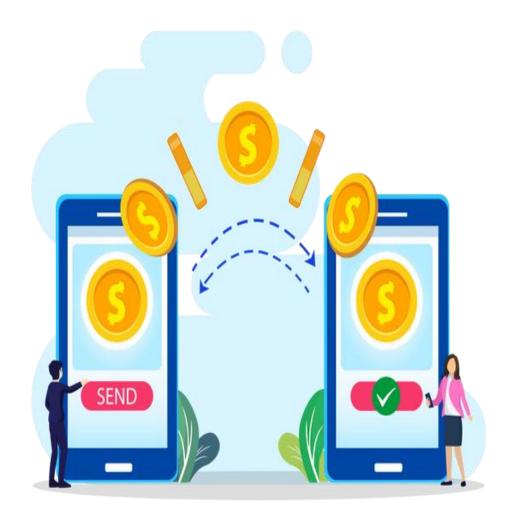
• This metric tracks how many people visit a company's website during a given period. Among other uses, it can help companies judge how effective their marketing efforts are at driving consumers to their site.

# **Digital Marketing Challenges**

- ▶ The digital world poses special challenges for marketers.
- ▶ For example, digital channels proliferate rapidly, and marketers have to keep up on them and figure out how to use them effectively.
- Marketers can also find it challenging to analyze and make productive use of the huge amount of data they can capture through these platforms.
- ▶ Perhaps most important, consumers are increasingly inundated with digital ads and other distractions, making it more and more difficult to capture their attention.

## **Cashless Transaction and Pitfall**

- Cashless payments simply mean the transaction takes place without the use of physical bills or coins.
- Cashless payments offer many benefits, but there are also some disadvantages to be aware of:
- Dependence on technology and internet access
  - → One major disadvantage is the dependence on technology and internet access. Without access to technology, you can't complete cashless payments. If you experience a power outage, a natural disaster, or are located in a remote area, cashless payments may not be available.



## **Cashless Transaction and Pitfall**

## Risk of fraud and hacking

→ With cashless payments, more financial information is stored online, so there is a higher chance that information can be stolen by cybercriminals. Cashless payments can also be vulnerable to hacking and other forms of digital fraud. That being said, as we mentioned earlier, there are many security layers, often making cashless payments more secure.

## Potential for privacy concerns

→ Most cashless payments require customers to provide personal and financial information. Data leaks or data sharing with third-party companies are a concern for some people. But you can mitigate this by explicitly stating on your payment page or through in-store signage that customer data is never shared.

### ► Harder for small businesses to implement

→ If you don't have the resources or technology to support cashless payments, it can be harder to compete with larger companies.

# Startup (ED-TECH)

# India's edtech market expected to grow to \$10 billion by 2025

India is the second largest market for e-learning after the US with a market size of \$6 billion, and is expected to grow to \$10 billion by 2025. K-12 leads the market in terms of sector-wise growth at \$2.7 billion, followed by College and Upskilling.

Source: https://www.cnbctv18.com/education/india-edtech-market-expected-to-grow-to-10-billion-by-2025-startups-unicorns-16391151.htm

# **Meaning of Startup**

- A startup is a company that's in the initial stages of business.
- Founders normally finance their startups and may attempt to attract outside investment before they get off the ground.
- Funding sources include family and friends, venture capitalists, crowdfunding, and loans.
- Startups must also consider where they'll do business and their legal structure.
- Startups come with high risk as failure is very possible but they can also be very unique places to work with great benefits, a focus on innovation, and great opportunities to learn.



## Introduction to ED-TECH

- ▶ EdTech, short for education technology, refers to new technological implementations in the classroom.
- In-classroom tablets, interactive projection screens and whiteboards, online content delivery, and MOOCs (Massive Online Open Online Courses) are all examples of EdTech.
- ▶ The goal of EdTech is to improve student outcomes, enhance individualized education, and reduce the teaching burden on instructors.

## **Introduction to ED-TECH**



- ▶ The introduction of technology into the educational process has caused a significant revolution in education.
- ▶ How students obtain knowledge and teachers impart it is being revolutionized in India, a nation with a sizable population and a wide range of educational demands. These forward-thinking businesses have played a critical role in bridging the divide between conventional classroom instruction and contemporary digital education.



















# **Top 10 Edtech Companies in India**

- 1. Byju's
- 2. Unacademy
- 3. FastInfo Class
- 4. Physics Wallah
- 5. Toppr
- 6. Adda247
- 7. Vedantu
- 8. SimplifyExams
- 9. UpGrad
- 10. Scaler

## **Benefits of ED-TECH**

- Personalized education caters to different learning styles.
- On-demand video lectures allow classroom time to focus on collaboration.
- ▶ Gamified lessons engage students more deeply.
- ▶ Cloud computing with 24/7 access lets students work from anywhere.
- Automated grading and classroom management tools help teachers balance responsibilities.