

Module 1: E-Commerce and its Technological Aspects

Overview of developments in Information Technology:

Computers and the internet are already a part of practically every aspect of business. Information technology has played an important role as a change agent in agriculture, mining, manufacturing and the service industries. This trend will continue and a greater number of activities will be impacted by IT in the coming days. Further developments in areas that are already computerised will evolve as technology finds faster and simpler ways for work to be done.

Some of the important new areas in the field of information technology are:

Cloud Computing – This involves the use of computing services over the internet.

Businesses do not need to invest in hardware or software for their requirements. Instead, they can opt for IaaS (Infrastructure as a Service), PaaS (Platform as a Service), and SaaS (Software as a Service).

Another advantage businesses gain with cloud computing is that the entire organisation, regardless of the location of employees, uses exactly the same servers and storage devices. This makes for greater standardisation and instant access to the same information across the company.

Digital Analytics – Practically all companies capture a large amount of data about their customers through their web properties and mobile apps. But putting this data to use and deriving information that is of help in serving customers better or getting new ones, is a complicated task.

Digital analytics is the analysis of this information to achieve greater customer satisfaction, increase client acquisition rates and improve the online experience of the people who visit the company's website.

Internet of Things – This refers to a situation where everyday objects have network connectivity which allows them to send and receive data. The basic ingredients which are required for this to happen are already in place as broadband internet is getting cheaper and more widely available. Additionally, more devices with Wi-Fi abilities are being made and smartphone penetration is growing at a rapid pace.

Artificial intelligence (AI) and Machine Learning (ML): AI and ML are revolutionizing various fields, including healthcare, finance, transportation and manufacturing, by automating tasks, making predictions, and providing insights from data.

Mobile Applications – An increasing number of people access the internet and company websites through smartphones and tablets instead of desktop computers or laptops. This trend is expected to accelerate and businesses need to develop mobile-friendly websites and applications if they want to retain existing customers and attract new ones.



Defining E-Commerce:

Electronic commerce (e-commerce) refers to companies and individuals that buy and sell goods and services over the internet.

E-commerce operates in different types of market segments and can be conducted over computers, tablets, smartphones, and other smart devices.

Nearly every imaginable product and service is available through e-commerce transactions, including books, music, plane tickets, and financial services such as stock investing and online banking. As such, it is considered a very disruptive technology.

“E-Commerce is the production, distribution, marketing, sales or delivery of goods and services by electronic means”- **World Trade organization**

“The process of buying and selling goods and services electronically involving transaction using the internet, networks and other digital technologies” – **Laudon and Laudon**



Types of E-commerce:

Depending on the goods, services, and organization of an ecommerce company, the business can opt to operate several different ways. Here are several of the popular business models.

Business-to-Consumer (B2C)

B2C e-commerce companies sell directly to the product end-user. Instead of distributing goods to an intermediary, a B2C company performs transactions with the consumer that will ultimately use the good.

Example: Amazon, Flip cart, Ebay, Netflix.

Business-to-Business (B2B)

Similar to B2C, an e-commerce business can directly sell goods to a user. However, instead of being a consumer, that user may be another company. B2B transactions often entail larger quantities, greater specifications, and longer lead times. The company placing the order may also have a need to set recurring goods if the purchase is for recurring manufacturing processes.

Business-to-Government (B2G):

Some entities specialize as government contractors providing goods or services to agencies or administrations. Similar to a B2B relationship, the business produces items of value and remits those items to an entity.

B2G e-commerce companies must often meet government requests for proposal requirements, solicit bids for projects, and meet very specific product or service criteria. In addition, there may be joint government endeavors to solicit a single contract through a government-wide acquisition contract.

Consumer-to-Consumer (C2C)

Established companies are the only entities that can sell things. E-commerce platforms such as digital marketplaces connect consumers with other consumers who can list their own products and execute their own sales.

Example: OLX, Quikr, EBay etc.

Consumer-to-Business (C2B)

Modern platforms have allowed consumers to more easily engage with companies and offer their services, especially related to short-term contracts, gigs, or freelance opportunities. For example, consider listings on up work.

A consumer may solicit bids or interact with companies that need particular jobs done. In this way, the e-commerce platform connects businesses with freelancers to enable consumer's greater power to achieve pricing, scheduling, and employment demands.

Consumer-to-Government (C2G):

Less of a traditional e-commerce relationship, consumers can interact with administrations, agencies, or governments through C2G partnerships. These partnerships are often not in the exchange of service but rather, the transaction of obligation.

Examples include individuals purchasing licenses or permits from the government, Tax filings, GST etc.

The scope of E-commerce:

The potential for e-commerce development is enormous. Now a days one can buy products online through some sites like Flip kart and Amazon. In the age of e-commerce everything from gym equipment to laptops are available online. E-Commerce is a super set of business cases. It includes E-trading, E-Franchising, E-Mailing, E-Engineering etc. Scope of e-commerce can be enumerated as follows:

1. Exchange of digitized information

2. Technology-enabled

3. Customers retention

4. Accounting

5. Supplier integration

6. Support the exchange

1. Exchange of digitized information: The digitized information exchange can represent communications between two parties, coordination of the flow of goods and service, or transmission of electronic orders. This exchange can be between organizations or individuals.

2. Technology-enabled: E-Commerce is about technology-enabled transactions. Web browsers are perhaps the best known of these technology-enabled customer interfaces. However, other interfaces including automated teller machines (ATMs) also fall in the general category of e-commerce. Business once managed transactions with customers and markets strictly through human interaction; in e-commerce, such transitions can be managed using technology.

3. Customers retention: E-Commerce enables organizations to get classified and customized market information that helps in retaining customers through fast order fulfilment and effective customer's relationship management (CRM). End-to-End supply chain management in e-commerce provides the opportunity the overall flow of demand and supply and results in fruitful customer's retention.

4. Accounting: Financial accounting, treasury management and asset management are best possible in e-commerce because of integrated database. Financial planning and strategy determination become more convenient in e-commerce.

5. Supplier integration: For lowering inventory-carrying costs and broader availability of material and opportunities supplier's network can be integrated through EDI to implement just-in-time (JIT) inventory management.

6. Support the exchange: E-Commerce includes intra and inter-organizational activities that support the exchange. The scope of e-commerce includes all electronically based intra and inter-organizational activities that directly or indirectly support marketplace exchange. In this sense, we are talking about a phenomenon that affects both How business organizations relate to external parties customers, suppliers, partners, competitors, and markets and how they operate internally in managing activities, processes and systems.

Electronic Market:

Electronic markets in e-commerce refer to online platforms or digital marketplaces where buyers and sellers interact to conduct transactions electronically. These platforms facilitate the buying and selling of goods and services over the internet, often eliminating the need for physical storefronts or face-to-face interactions.

Electronic markets in e-commerce come in various forms, including:

1. Online Marketplaces: These are platforms where multiple sellers offer their products or services to a large pool of potential buyers. Examples include Amazon, eBay, and Etsy.

2. E-Commerce Websites: These are websites operated by individual businesses that sell directly to consumers. Examples include the online stores of retail chains like Walmart or Target, as well as niche brands that exclusively sell online.

3. Consumer-to-Consumer (C2C) Platforms: These platforms enable individuals to sell goods or services directly to other consumers. Examples include Craigslist, Facebook Marketplace, and platforms like Depop for second-hand fashion.

4. Digital Platforms for Digital Goods: These platforms specialize in selling digital products such as software, e-books, music, and digital art. Examples include Apple's App Store, Google Play Store, and platforms like Steam for video games.

5. Social Commerce platforms: Social media platforms may also serve as electronic markets, allowing users to discover and purchase products directly through the platforms.

Electronic Data Interchange:

An Electronic Data Interchange (EDI) is a system for exchanging business documents and transactions electronically between trading partners or companies. Instead of using paper documents like invoices, purchase orders, and shipping notices, EDI allows for the transfer of data in a standardized format from one computer system to another.

Key components of EDI include:

1. Standards: EDI standards define the formats and structures for exchanging different types of business documents electronically. Common standards include ANSI ASC X12, UN/EDIFACT, and XML.

2. Translation Software: To send and receive EDI messages, organizations use specialized software known as EDI translators or EDI converters. These tools translate data from internal formats to the standardized EDI format and vice versa.

3. Communication Protocols: EDI messages are typically transmitted over secure communication protocols such as

A. **AS2 (Applicability Statement 2):** is a specification on how to transport structured business-to-business data securely and reliably over the Internet.

B. **SFTP (Secure File Transfer Protocol (SFTP))** is a network protocol for securely accessing, transferring and managing large files and sensitive data.

C. **HTTP (The Hypertext Transfer Protocol (HTTP))** is the foundation of the World Wide Web, and is used to load webpages using hypertext links. HTTP is an application layer protocol designed to transfer information between networked devices and runs on top of other layers of the network protocol stack).

4. Trading Partners: To engage in EDI, organizations must establish agreements and standards with their trading partners regarding the types of documents to be exchanged, the EDI standards to be used, and the communication protocols.

Benefits of EDI include:

- A. **Efficiency:** EDI eliminates manual data entry and reduces the time and errors associated with paper-based processes.
- B. **Cost Savings:** By streamlining business processes, EDI can lead to cost savings in terms of labor, paper, printing, and postage.
- C. **Accuracy:** EDI reduces the risk of errors that can occur during manual data entry or when transferring information between different systems.
- D. **Faster Transactions:** EDI enables faster transaction processing, allowing companies to respond more quickly to customer orders and market demands.

Internet Commerce:

Internet commerce, also known as e-commerce, refers to the buying and selling of goods and services over the internet. It encompasses a wide range of transactions conducted electronically, from online retail purchases to electronic funds transfers and online auctions. Internet commerce has become increasingly popular due to the convenience it offers to both businesses and consumers.

Key components of internet commerce include:

1. Online Stores: These are websites where businesses showcase their products or services and allow customers to browse, select, and purchase items electronically. Online stores can range from small independent retailers to large multinational corporations.

2. Electronic Payments: Internet commerce relies on electronic payment methods to facilitate transactions. These payment methods include credit cards, debit cards, digital wallets (e.g., PayPal, Apple Pay), bank transfers, and crypto currency.

3. Online Marketplaces: Online marketplaces are platforms that bring together multiple sellers and buyers, facilitating transactions between them. Examples include Amazon, eBay, Alibaba, and Etsy.

4. Digital Products and Services: Internet commerce extends beyond physical goods to include digital products and services such as software, e-books, music, streaming services, online courses, and digital downloads.

5. Mobile Commerce (M-commerce): With the increasing use of smartphones and tablets, many internet commerce transactions now occur through mobile devices. M-commerce involves buying and selling goods and services using mobile apps or mobile-optimized websites.

6. Supply Chain Management: Internet commerce involves various processes related to supply chain management, including inventory management, order fulfillment, shipping, and logistics. Efficient supply chain management is crucial for ensuring timely delivery and customer satisfaction in internet commerce.

7. Security and Privacy: Given the sensitive nature of financial transactions conducted online, security and privacy are paramount in internet commerce. Secure encryption protocols, authentication mechanisms, and data protection measures are employed to safeguard sensitive information and prevent unauthorized access.

Advantages and Disadvantages of E-commerce:

E-commerce offers consumers the following advantages:

- **Convenience:** E-commerce can occur 24 hours a day, seven days a week. Although E-Commerce may take a lot of work, it is still possible to generate sales as you sleep or earn revenue while you are away from your store.
- **Increased Selection:** Many stores offer a wider array of products online than they carry in their brick-and-mortar counterparts. And many stores that solely exist online may offer consumers exclusive inventory that is unavailable elsewhere.
- **Potentially Lower Start-up Cost:** E-commerce companies may require a warehouse or manufacturing site, but they usually don't need a physical storefront. The cost to

operate digitally is often less expensive than needing to pay rent, insurance, building maintenance, and property taxes.

- **International Sales:** As long as an e-commerce store can ship to the customer, an e-commerce company can sell to anyone in the world and isn't limited by physical geography.
- **Easier to Retarget Customers:** As customers browse a digital storefront, it is easier to entice their attention towards placed advertisements, directed marketing campaigns, or pop-ups specifically aimed at a purpose.

Disadvantages

There are certain drawbacks that come with e-commerce sites, too. The disadvantages include:

- **Limited Customer Service:** If you shop online for a computer, you cannot simply ask an employee to demonstrate a particular model's features in person. And although some websites let you chat online with a staff member, this is not a typical practice.
- **Lack of Instant Gratification:** When you buy an item online, you must wait for it to be shipped to your home or office. However, e-tailers like Amazon make the waiting game a little bit less painful by offering same-day delivery as a premium option for select products.
- **Inability to Touch Products:** Online images do not necessarily convey the whole story about an item, and so e-commerce purchases can be unsatisfying when the products received do not match consumer expectations. Case in point: an item of clothing may be made from shoddier fabric than its online image indicates.
- **Reliance on Technology:** If your website crashes, garners an overwhelming amount of traffic, or must be temporarily taken down for any reason, your business is effectively closed until the e-commerce storefront is back.
- **Higher Competition:** Although the low barrier to entry regarding low cost is an advantage, this means other competitors can easily enter the market. E-commerce companies must have good marketing strategies and remain diligent on SEO optimization to ensure they maintain a digital presence.

Generic framework for E-commerce:

Here's a generic framework for E-commerce, outlining key components and considerations:

1. Market Analysis and Research:

- Identify target markets and customer segments.
- Conduct market research to understand consumer preferences, behaviors, and trends.
- Analyze competitors and industry dynamics to identify market opportunities and challenges.

2. Business Model Development:

- Define the business model, including revenue streams, pricing strategies, and value proposition.
- Choose between different e-commerce models (e.g., B2C, B2B, C2C) based on target markets and products/services offered.
- Determine distribution channels, fulfillment options, and logistics strategies.

3. Website Development and Design:

- Build a user-friendly and responsive e-commerce website or platform.
- Design intuitive navigation, product pages, checkout process, and search functionality.
- Optimize website performance, speed, and security for seamless user experience

4. Product and Inventory Management:

- Curate a product catalog based on market demand, profitability, and competitive positioning.
- Implement inventory management systems to track stock levels, replenish inventory, and manage product variants.

- Develop product descriptions, images, and specifications to enhance product visibility and conversion rates.

5. Payment Processing and Security:

- Integrate secure payment gateways to facilitate online transactions and process payments securely.

- Implement encryption, SSL certificates, and fraud detection measures to protect customer data and financial transactions.

- Ensure compliance with payment card industry (PCI) standards and data protection regulations.

6. Marketing and Customer Acquisition:

- Develop a comprehensive digital marketing strategy to attract and engage target customers.

- Utilize various marketing channels, including search engine optimization (SEO), social media, email marketing, and content marketing.

- Create compelling content, promotions, and discounts to drive traffic, generate leads, and increase sales.

7. Customer Experience and Support:

- Provide personalized and responsive customer service across multiple channels (e.g., live chat, email, phone).

- Optimize the checkout process for simplicity and convenience, minimizing cart abandonment rates.

8. Analytics and Performance Measurement:

- Implement web analytics tools to track website traffic, user behavior, and conversion metrics.

- Monitor key performance indicators (KPIs), such as conversion rate, average order value, and customer lifetime value.

- Use data-driven insights to optimize marketing campaigns, website design, and product offerings for continuous improvement.

9. Legal and Regulatory Compliance:

- Ensure compliance with e-commerce laws, regulations, and consumer protection policies in target markets.

- Address legal requirements related to privacy, data protection, terms of service, and refund policies.

- Stay updated on changes in e-commerce regulations and adapt business practices accordingly.

10. Continuous Innovation and Adaptation:

- Embrace innovation and technology trends to stay competitive and meet evolving customer expectations.

- Experiment with new features, technologies, and business models to drive growth and differentiation.

Architectural framework of Electronic Commerce:

Here's an architectural framework for electronic commerce (e-commerce):

1. Presentation Layer: This layer represents the user interface (UI) of the e-commerce platform, where customers interact with the system. It includes web pages, mobile apps, and other interfaces through which users browse products, view information, and make purchases. Design considerations include user experience (UX), accessibility, and responsiveness across devices.

2. Application Layer: The application layer contains the core business logic and functionality of the e-commerce platform. It includes various modules and components responsible for managing product catalogues, processing orders, handling payments, and implementing business rules.

Key components may include:

- A. Product Management:** Manages product information, inventory, pricing, and categorization.
- B. Order Management:** Processes orders, tracks order status, manages shipping, and handles returns.
- C. Payment Processing:** Integrates with payment gateways to securely process online payments.
- D. Customer Management:** Manages customer accounts, profiles, preferences, and interactions.
- E. Content Management:** Manages website content, including product descriptions, images, and promotional materials.

3. Data Layer:

- The data layer stores and manages the underlying data used by the e-commerce platform. This includes product data, customer information, order history, transaction records, and other relevant data. Considerations for the data layer include:

4. Infrastructure Layer:

- The infrastructure layer comprises the underlying hardware and software infrastructure that supports the operation of the e-commerce platform. This includes servers, networks, hosting services, and cloud infrastructure. Considerations for the infrastructure layer include:

Web based E-Commerce Architecture:

Web-based e-commerce is one of the fast growing segments of the technology that defines the business strategy. Web-based E-commerce provides easy and better communication between geographically separated buyers and sellers.

The Web provides an array of electronics tools such as e-mail and Web pages for E-commerce and its related processes.

1. Planning for web-based E-commerce architecture.

2. Understanding the roles of buyers and sellers.

3. Analyzing the requirements of buyers and sellers.

4. Resolving the issues in Web-based E-commerce.

******* The End *******