

## **UNIT 1: INTRODUCTION TO ELECTRIC COMMERCE**

### **ECOMMERCE**

Electronic + Commerce (The activity of buying and selling)

#### **What is Ecommerce?**

Essentially, ecommerce (or electronic commerce) is the buying and selling of goods (or services) on the internet.

From mobile shopping to online payment encryption and beyond, ecommerce encompasses a wide variety of data, systems, and tools for both online buyers and sellers.

Most businesses with an ecommerce presence use an ecommerce store and/or an ecommerce platform to conduct both online marketing and sales activities and to oversee logistics and fulfillment.

Keep in mind that ecommerce has a few different spelling variations. All of these are synonymous and correct — their use is largely preference-based.

- E-Commerce
- eCommerce
- Ecommerce
- e-commerce and so. on.

#### **Introduction**

E-commerce is a modern business methodology that addresses the needs of organizations, suppliers and consumer to cut costs while improving the quality of goods and services and increasing the speed of service delivery. It applies to the use of computer networks to search and retrieve information in support of human and corporate decision making.

Electronic commerce (e-commerce) remains a relatively new, emerging and constantly changing area of business management and information technology. E-commerce is digitally enabled commercial transactions between and among organizations and individuals. *Digitally enabled transactions* include all transactions mediated by digital technology e.g. Internet. For the most part, this means transactions that occur over the Internet and the Web. *Commercial transactions* involve the exchange of value (e.g., money) across organizational or individual boundaries in return for products and services. Exchange of value is important for understanding the limits of e-commerce. Without an exchange of value, no commerce occurs.

Some of the definitions of e-commerce often hard and found in publications and the media are:

- Electronic Commerce (EC) is where business transaction take place via telecommunication networks, especially the internet.
- Electric commerce describes the buying and selling of products, services and information via computer networks including the internet.
- Electronic commerce is about doing business electronically.
- E-commerce is defined as the conduct of a financial transaction by electronic means.

### **Advantages of Ecommerce:**

- Faster buying/selling procedure, as well as easy to find products.
- Buying/selling 24/7.
- More reach to customers, there is no theoretical geographic limitations.
- Low operational costs and better quality of services.
- No need of physical company set-ups.
- Easy to start and manage a business.
- Customers can easily select products from different providers without moving around physically.

### **Disadvantages of ecommerce:**

- Any one, good or bad, can easily start a business. And there are many bad sites which eat up customers' money.
- There is no guarantee of product quality.
- As there is minimum chance of direct customer to company interactions, customer loyalty is always on a check.
- There are many hackers who look for opportunities, and thus an ecommerce site, service, payment gateways, all are always prone to attack.

### **History of Ecommerce?**

Assignment

## What are the best ecommerce platforms?

### Shopify

#### Here are some Shopify facts:

- Shopify powers over **2,921,565 websites** around the globe.
- Shopify has **21% of the ecommerce market share**.

A popular choice among many SMBs, Shopify allows clients to build effective online stores and scale their business. Created with a user-friendly and intuitive interface, as well as tons of templates, this platform offers flexible shipping rates, automatic taxes, and over 100 payment gateways. Shopify enables social media integrations, is packed with built-in SEO features, and is fully hosted.

**Best for:** Small businesses looking for an all-in-one ecommerce solution.

### Amazon

#### Here are some Amazon facts:

- Statistics show that Amazon is the largest ecommerce seller in the United States **with \$280.5 billion net sales made in 2019**.
- The ecommerce giant has around **101 million US based Amazon prime members** which on average spend \$1,400 a year on online purchases.

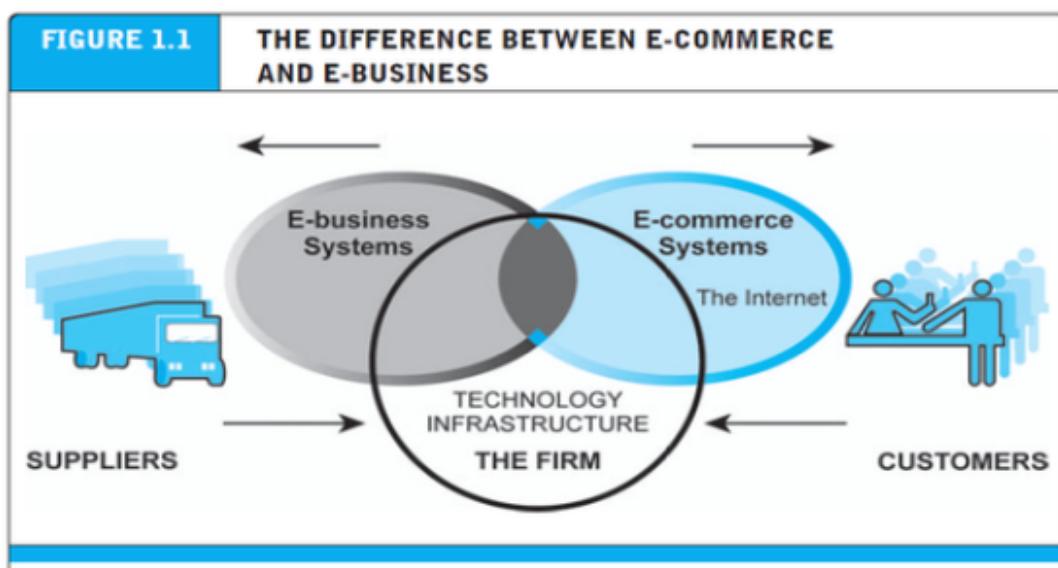
A company that needs no introduction, **Amazon** is one of the biggest online marketplace in the world. It offers customers a wide selection of products from retailers around the globe and enables businesses to reach a large audience.

**Best for:** Big businesses that want to expand their sales channels.

And so. on

## THE DIFFERNCE BETWEEN E-COMMERCE & E-BUSINESS

**E-business** refers primarily to the digital enablement of transactions and processes *within* a firm, involving information systems under the control of the firm as shown in figure below.



E-commerce primarily involves transactions that cross firm boundaries. E-business primarily involves the application of digital technologies to business processes within the firm.

For the most part, in our view, e-business does not include commercial transactions involving an exchange of value across organizational boundaries. For example, a company's online inventory control mechanisms are a component of e-business, but such internal processes do not directly generate revenue for the firm from outside businesses or consumers, as e-commerce, by definition, does. It is true, however, that a firm's e-business infrastructure provides support for online e-commerce exchanges; the same infrastructure and skill sets are involved in both e-business and e-commerce. E-commerce and e-business systems blur together at the business firm boundary, at the point where internal business systems link up with suppliers or customers, for instance. E-business applications turn into e-commerce precisely when an exchange of value occurs.

## BENEFITS OF ECOMMERCE

The benefits of ecommerce can be seen to affect three major stakeholders; organizations, consumers and society.

- ***Benefits of e-commerce to organizations***

**International marketplace:** What used to be a single physical marketplace located in a geographical area has now become a borderless marketplace including national and international markets. By becoming e-commerce enabled, businesses now have access to people all around the world.

**Operational cost savings:** The cost of creating, processing, distributing, storing and retrieving paper-based information has decreased.

**Mass customisation:** E-commerce has revolutionised the way consumers buy good and services. In the past when Ford first started making motor cars, customers could have any colour so long as it was black. Now customers can configure a car according to their specifications within minutes on-line via the [www.ford.com](http://www.ford.com) website.

**Enables reduced inventories and overheads by facilitating ‘pull’-type supply chain management** – this is based on collecting the customer order and then delivering through JIT (just-in-time) manufacturing. This is particularly beneficial for companies in the high technology sector, where stocks of components held could quickly become obsolete within months. For example, companies like Motorola (mobile phones), and Dell (computers) gather customer orders for a product, transmit them electronically to the manufacturing plant where they are manufactured according to the customer’s specifications (like colour and features) and then sent to the customer within a few days.

**Lower telecommunications cost:** The Internet is much cheaper than value added networks (VANs) which were based on leasing telephone lines for the sole use of the organisation and its authorised partners. It is also cheaper to send a fax or e-mail via the Internet than direct dialling.

**Digitisation of products and processes.** Particularly in the case of software and music/video products, which can be downloaded or e-mailed directly to customers via the Internet in digital or electronic format.

**No more 24-hour-time constraints:** Businesses can be contacted by or contact customers or suppliers at any time.

- ***Benefits of e-commerce to consumers***

**24/7 access:** Enables customers to shop or conduct other transactions 24 hours a day, all year round from almost any location. For example, checking balances, making payments, obtaining travel and other information.

**More choices:** Customers not only have a whole range of products that they can choose from and customise, but also an international selection of suppliers.

**Price comparisons:** Customers can ‘shop’ around the world and conduct comparisons either directly by visiting different sites. (for example [www.moneyextra.co.uk](http://www.moneyextra.co.uk) for financial products and services).

**Improved delivery processes:** This can range from the immediate delivery of digitised or electronic goods such as software or audio-visual files by downloading via the Internet, to the on-line tracking of the progress of packages being delivered by mail or courier.

*An environment of competition* where substantial discounts can be found or value added, as different retailers for customers.

- ***Benefits of e-commerce to society***

*Enables more flexible working practices*, which enhances the quality of life for a whole host of people in society, enabling them to work from home. It also potentially reduces environmental pollution as fewer people have to travel to work regularly.

*Connects people*. Enables people in developing countries and rural areas to enjoy and access products, services, information and other people which otherwise would not be so easily available to them.

*Facilitates delivery of public services*. For example, health services available over the Internet (on-line consultation with doctors or nurses), filing taxes over the Internet through the Inland Revenue website.

## LIMITATIONS OF E-COMMERCE

There was much hype surrounding the Internet and e-commerce over the last few years of the twentieth century. Much of it promoted the Internet and e-commerce as the panacea for all ills, which raises the question, are there any limitations of e-commerce and the Internet?

Isaac Newton’s 3rd Law of Motion, ‘For every action there is an equal and opposite reaction’ suggests that for all the benefits there are limitations to e-commerce. These again will be dealt with according to the three major stakeholders – organisations, consumers and society.

### ***Limitations of e-commerce to organisations***

*Lack of sufficient system security, reliability, standards and communication protocols.*

There are numerous reports of websites and databases being hacked into, and security holes in software. For example, Microsoft has over the years issued many security notices and ‘patches’ for their software. Several banking and other business websites, including Barclays Bank, Powergen and even the Consumers’ Association in the UK, have experienced breaches in security where ‘a technical oversight’ or ‘a fault in its systems’ led to confidential client information becoming available to all.

*Rapidly evolving and changing technology*, so there is always a feeling of trying to ‘catch up’ and not be left behind.

*Under pressure to innovate* and develop business models to exploit the new opportunities which sometimes leads to strategies detrimental to the organisation. The ease with which business models can be copied and emulated over the Internet increase that pressure and curtail longer-term competitive advantage.

*Facing increased competition* from both national and international competitors often leads to price wars and subsequent unsustainable losses for the organisation.

*Problems with compatibility of older and ‘newer’ technology*. There are problems where older business systems cannot communicate with web-based and Internet infrastructures, leading to some organisations running almost two independent systems where data cannot be shared. This often leads to having to invest in new systems or an infrastructure, which bridges the different systems. In both cases this is both financially costly as well as disruptive to the efficient running of organisations.

### **Limitations of e-commerce to consumers**

*Computing equipment* is needed for individuals to participate in the new ‘digital’ economy, which means an initial capital cost to customers.

*A basic technical knowledge* is required of both computing equipment and navigation of the Internet and the World Wide Web.

*Cost of access to the Internet*, whether dial-up or broadband tariffs.

*Cost of computing equipment*. Not just the initial cost of buying equipment but making sure that the technology is updated regularly to be compatible with the changing requirement of the Internet, websites and applications.

*Lack of security and privacy of personal data*. There is no real control of data that is collected over the Web or Internet. Data protection laws are not universal and so websites hosted in different countries may or may not have laws which protect privacy of personal data.

*Physical contact and relationships are replaced by electronic processes*. Customers are unable to touch and feel goods being sold on-line or gauge voices and reactions of human beings.

*A lack of trust because they are interacting with faceless computers*.

### **Limitations of e-commerce to society**

*Breakdown in human interaction*. As people become more used to interacting electronically there could be an erosion(divide) of personal and social skills which might eventually be detrimental to the world we live in where people are more comfortable interacting with a screen than face to face.

*Social division*. There is a potential danger that there will be an increase in the social divide between technical haves and have-nots – so people who do not have technical skills become unable to secure better-paid jobs and could form an underclass with potentially dangerous implications for social stability.

*Reliance on telecommunications infrastructure, power and IT skills*, which in developing countries nullifies the benefits when power, advanced telecommunications infrastructures and IT skills are unavailable or scarce or underdeveloped.

*Wasted resources*. As new technology dates quickly how do you dispose of all the old computers, keyboards, monitors, speakers and other hardware or software?

*Facilitates Just-In-Time manufacturing*. This could potentially cripple an economy in times of crisis as stocks are kept to a minimum and delivery patterns are based on pre-set levels of stock which last for days rather than weeks .

*Difficulty in policing the Internet*, which means that numerous crimes can be perpetrated and often go undetected. There is also an unpleasant rise in the availability and access of obscene material and ease with which paedophiles and others can entrap children by masquerading in chat rooms.

## FEATURES OF E-COMMERCE TECHNOLOGY

**Ubiquity:** In traditional commerce, a marketplace is restricted i.e. we can be in limited physical area to buy or sell. Whereas E-Commerce is ubiquitous meaning that it is available just about everywhere, at all times. It make possible to shop from your desktop, at home, at work or even from your car, using mobile commerce. The result is called a market space - a marketplace extended beyond traditional boundaries and removed from a temporal and geographic location. From a consumer perspective, ubiquity reduces transaction costs – the costs of participating in a market. To transact, it is no longer necessary that you spend time and money traveling to a market.

**Global Reach:** Unlike traditional commerce, e-commerce technology permits commercial transaction to cross cultural and national boundaries far more conveniently and cost effectively. As a result, the potential market size for e-commerce merchants is roughly equal to the size of the world's online population.

**Universal Standards:** One strikingly unusual feature of e-commerce technologies is that the technical standards of the Internet, and therefore the technical standards for conducting e- commerce, are universal standards – they are shared by all nation around the world. In contrast, most traditional commerce technologies differ from one nation to the next. For instance, television and radio standards differ around the world, as doe's cell telephone technology. The universal technical standards of e-commerce greatly lower market entry cost –t he cost merchants must pay just to bring their goods to market.

**Richness:** With the use of e-commerce technology merchant can present their message in effective way. Information richness refers to the complexity and content of the message.

**Interactivity:** E-Commerce technologies are interactive, meaning they allow two-way communication between merchant and consumer. Television, for instant, cannot ask the viewer any questions, enter into a conversation with a viewer, or request customer information be entered into a form. In contrast, all of these activities are possible on an e-commerce Web site.

Interactivity allows an online merchant to engage a consumer in a ways similar to a face-to-face experience, but on a much more massive, global scale.

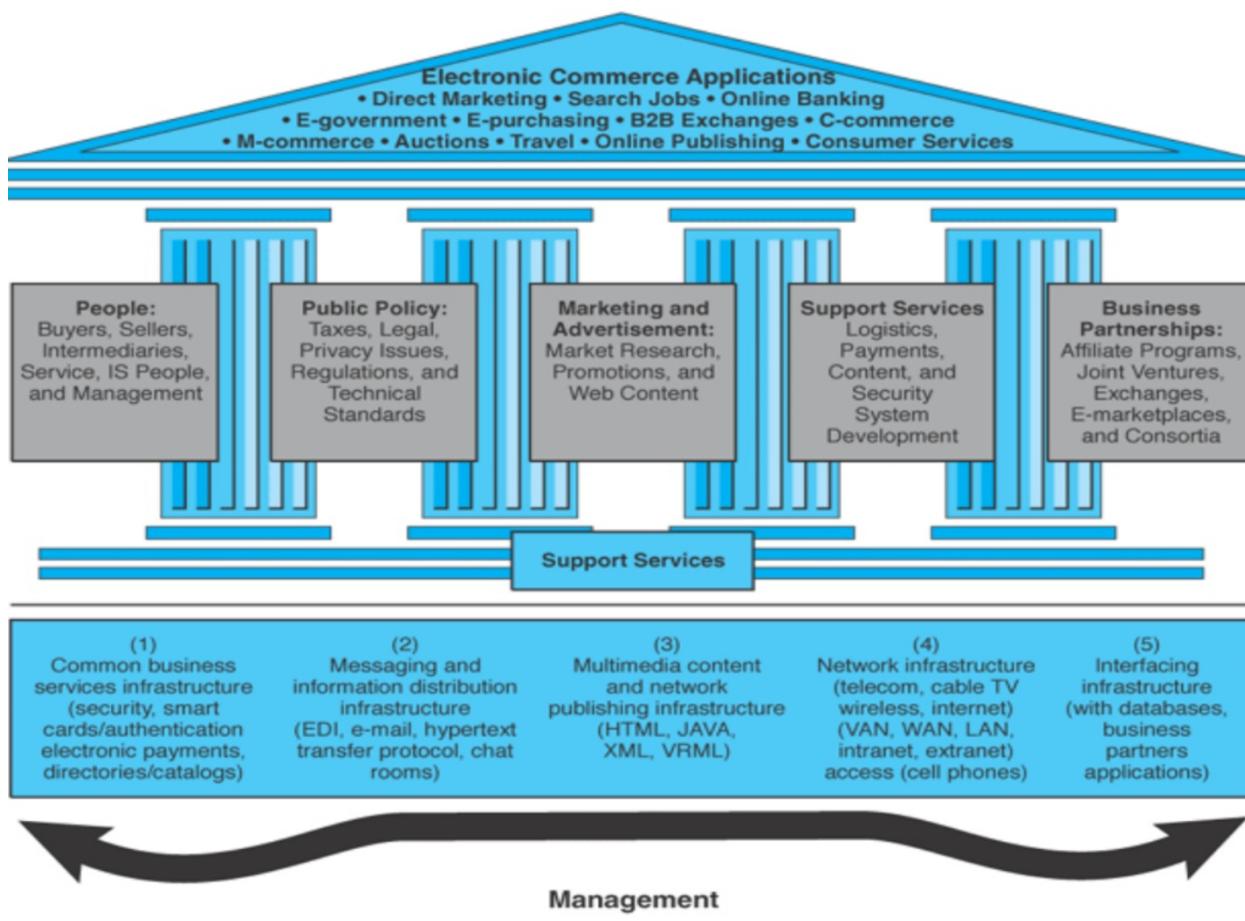
**Information density:** The Internet and the Web vastly increase information density – the total amount and quality of the information available to all market participants, consumers and merchants alike.

E-commerce technologies reduce information collection, storage, processing and communication costs. At the same time, these technologies increase greatly the accuracy and timeliness of information – making information more useful and important than ever. As a result, information becomes more plentiful, cheaper and of higher quality.

**Personalization/Customization:** E-commerce technologies permit personalization: Merchants can target their marketing message to specific individuals by adjusting the message. The technology also permits customization – changing the delivered product or service based on a user’s preference or prior behavior.

## **E-Commerce Framework**

E-Commerce applications will be built on the existing technology infrastructure - a myriad of computers, communication networks, and communication software forming the Information Superhighway. The **technology infrastructure** of the Internet is both an enabler and a driver of change. An infrastructure is defined as “*the foundation of a system.*” In this case, the technological foundation of the Internet, simply put, enables the running of the e-commerce enterprises. The hardware backbone of computers, routers, servers, fiber optics, cables, modems, and other network technologies provides half of the technology equation. The other half includes the soft-ware and communications standards that run on top of the hardware, including the core protocols for the Web. Understanding technology infrastructure—and therefore understanding what is and is not achievable—is essential to formulating a company’s vision and strategy.



The framework for e-Commerce consists of three parts as shown in below figure.

1. The first part consists of a variety of *electronic commerce applications* including both inter- and intra-organizational and electronic market examples such as Supply Chain Management, Video-on-Demand, Procurement and purchasing, On-line marketing and advertising, Home shopping etc.
2. The second part of the building blocks of the infrastructure consists of:
  - **Common business services**, for facilitating the buying and selling process.
  - **Messaging and information distribution**, as a means of sending and retrieving information (example: EDI, email, P2P file transfer)
  - **Multimedia and information distribution**, for creating a product and a means to communicate about it.
  - **Information superhighway infrastructure**, consisting of telecommunication, cable operator, ISPs, Wireless technologies and Internet.

3. The third part consists of the *public policy* and *technical standards* necessary to support the applications and the infrastructure.
  - **Public policies** govern issues like universal access, privacy, and information pricing. The public policy infrastructure affects not only the specific business but also direct and indirect competitors. It should take into consideration of:
    - ◆ Cost of accessing information
    - ◆ Regulation to protect consumers from fraud and protect their right to privacy
    - ◆ Policies to global information traffic to detect information pirating and obscene sites.
  - **Technical Standards** governs issues like technology for communication and as well as for Internet



Fig: Generic Framework of Electronic Commerce

## E-COMMERCE SUCCESS FACTORS

- **Selection and Value**
  - ⇒ Attractive product selections, competitive prices, satisfaction guarantees, and customer support after the sale
- **Performance and service**
  - ⇒ Fast, easy navigation, shopping, and purchasing, and prompt shipping and delivery
- **Look and Feel**
  - ⇒ Attractive web storefront, website shipping areas, multimedia product catalog pages and shopping features.
- **Advertising and Incentives**
  - ⇒ Targeted web page advertisement and email promotions, discounts and special offers, including advertising at affiliate sites.
- **Personal Attention**
  - ⇒ Personal web pages, personalized product recommendations, web advertising and email notices and interactive support for all customers.
- **Community Relationships**
  - ⇒ Virtual communities of customers, suppliers, company representatives and others via newsgroup, chat rooms and links to related sites.
- **Security and Reliability**
  - ⇒ Security of customer information and website transactions, trustworthy product information and reliable order fulfillment.

### Types of ecommerce business:

There are many ways to classify ecommerce business, we can categorize them according to the product or services that they sell, the parties that they transact with, or even the platform on which they operate.

Of which they can be as:

- **Classifying ecommerce business according to what they sell:**

1. **Stores that sells physical goods**

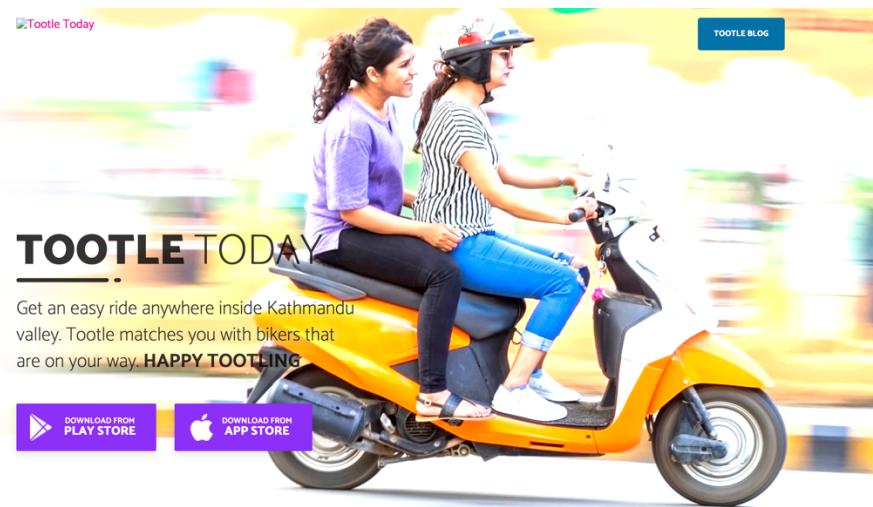
These are your typical online retailers. Clothing, furniture, tools, and accessories are all examples of physical goods. Shoppers can buy physical goods through online stores by visiting the stores' websites, adding items in their shopping cart, and making a purchase.

Once the shopper has made a purchase, the store delivers the item(s) right at their doorstep. There are also online stores where customers can make an online purchase but go to the store themselves to pick up the product.

The screenshot shows a website header with a logo 'TF' and navigation links for HOME, SHOES, ACCESSORIES, BAGS, ANCILLARY, ABOUT, and CONTACT. A search bar and a shopping cart icon are also present. Below the header, a section titled 'RESULT OF: shoes' displays a product image of two brown leather monk-strap shoes. The product details show it's a 'BABY SHOE (BOY)' under the 'SHOES' category at 2490 NRP. Buttons for 'BUY NOW' and 'ADD TO CART' are visible. At the bottom, there are navigation arrows for the product gallery.

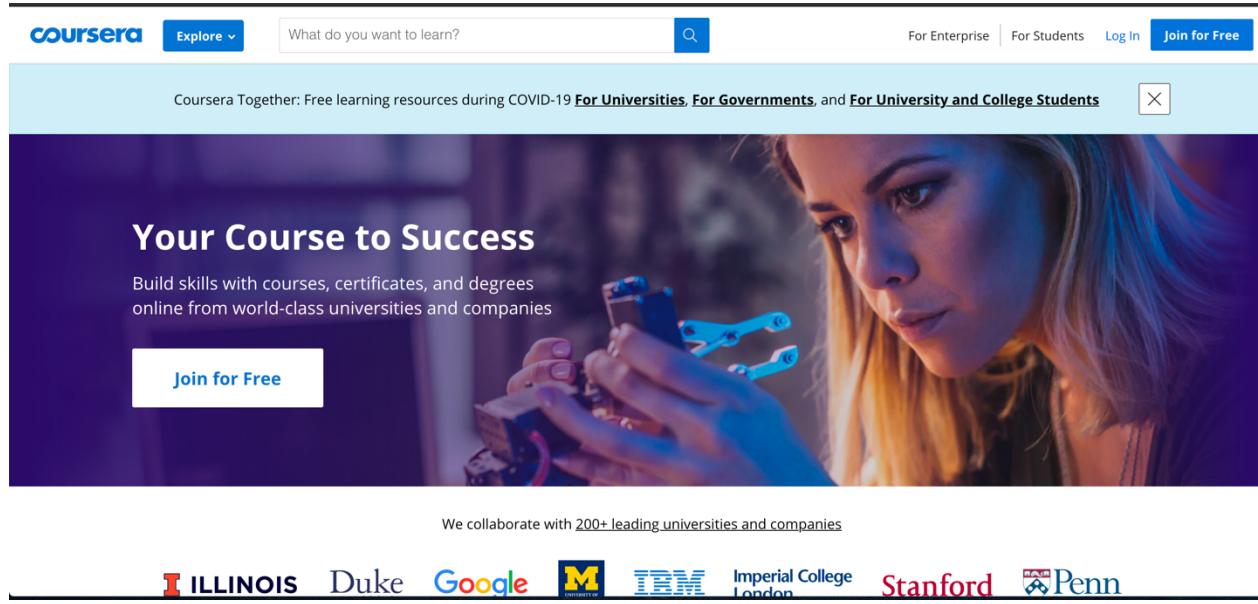
## 2. Service based e-tailers

Aside from products, services can also be purchased online. Everytime you hire educators, freelancers, and consultants through online platforms, you're doing business with service-based e-tailers. (An **e-tailer** is a retailer that primarily uses the Internet as a medium for customers to shop for goods and/or services provided)



### 3. Digital products

Ecommerce transactions are conducted via the internet which is why, in the ecommerce realm, products are usually referred as “e-goods”. The term digital products refers to all items that are in a digital format including ebooks, online courses, software, graphics, and virtual goods. Examples of retailers that sell digital products **Coursera** (a platform for online learning) and **Audiobooks** (a website where you can buy audio books).



- Classifying ecommerce on the basis of parties involved or **the six main model** of ecommerce of which the businesses are categorized into:
  - 1) B2C
  - 2) B2B
  - 3) C2C
  - 4) C2B
  - 5) B2G
  - 6) G2B
  - 7) C2G

Let's look at these in detail:

1) B2C (Business to Consumer)

B2C ecommerce encompasses transactions made between a business and a consumer. This is one of the most widely used sales models in the ecommerce context. When you buy shoes from an online shoe retailer, it is a business-to-consumer transaction. Some of the examples are Amazon.com, SastoDeal and soon.

2) B2B (Business to Business)

In the B2B ecommerce model both parties involved are businesses. In this type of a transaction, one business provides the other with products and/or services.

B2B e-commerce is simply defined as ecommerce between companies., This is the type of ecommerce that deals with relationship between and among businesses.

B2B is all about transactions between one organization and their partners, mostly B2B applications are in the areas of supplier management, inventory management, distribution management and payment management.

Slack, a platform for communication between remote business and Xero, a cloud-based accounting software for businesses, are some of the examples of B2B business model. Alibaba is also an example.

3) C2C (Consumer to Consumer)

C2C ecommerce happens when the two parties involved are consumers that trade with one another or C2C is simply commerce between private individuals or consumers.

HamroBazar is an example of online market place where individuals buy and sell products to each other.

4) C2B (Consumer to Business)

The C2B business model represents a transaction in which individuals create value for businesses, unlike the traditional business-to-consumer model where companies are the ones that deliver value. Consumers provide companies with products and/or services, co-operate on projects, and ultimately help businesses increase their profits.

An example of this would be a business model like iStockPhoto, in which stock photos are available online for purchase directly from different photographers.

5) B2G (Business to Government)

The B2G model refers to companies and businesses that provide goods and services for the government. For example, OpenGov is a company that offers governments cloud-based platforms for communication, reporting, and budgeting

6) G2B (Government to Business)

The G2B ecommerce models happen when the government provides companies with goods and services. Government procurement, data centres, and e-learning are all examples of G2B ecommerce.

7) C2G (Consumer to Government)

Every time consumers pay taxes, health insurance, electronic bills, or request information concerning the public sector, they're engaging in C2G. Make note that we've included all these sections to give you a general idea of ecommerce classification, although models like G2C or C2G are part of ecommerce only in its loosest definition. 80% of the time, when we're talking about ecommerce, we're talking about the B2C or the B2B model.

## M-Commerce

- M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as cellular telephone and personal digital assistants (PDAs). Known as next-generation e-commerce, m-commerce enables users to access the Internet without needing to find a place to plug in.
- “Mobile Business”, signifies an “anytime and anywhere access” to business processes managed by computer-mediated networks.
- As content delivery over wireless devices becomes faster, more secure, and scalable, there is wide speculation that m-commerce will surpass wire line e-commerce as the method of choice for digital commerce transactions.

The industries affected by m-commerce include:

- ⇒ Financial services, which includes mobile banking (when customers use their handheld devices to access their accounts and pay their bills) as well as brokerage services, in which stock quotes can be displayed and trading conducted from the same handheld device
- ⇒ Telecommunications, in which service changes, bill payment and account reviews can all be conducted from the same handheld device
- ⇒ Service/retail, as consumers are given the ability to place and pay for orders on-the-fly
- ⇒ Information services, which include the delivery of financial news, sports figures and traffic updates to a single mobile device

- Mobile commerce was born in 1997 when the first two mobile phone enabled Coca Cola vending machines were installed in the Helsinki area in Finland. They used SMS text messages to send the payment to the vending machines.
- In 1997 also the first mobile phone based banking service was launched by Merita bank of Finland also using SMS.

## Attributes of M-Commerce and Its Economic Advantages

- **Mobility:** -users carry cell phones or other mobile devices
- **Broad reach:**-people can be reached at any time
- **Ubiquity:**-easier information access in real-time
- **Convenience:**-devices that store data and have Internet, intranet, extranet connections\
- **Instant connectivity:**-easy and quick connection to Internet, intranets, other mobile devices,
- **Databases Personalization:**-preparation of information for individual consumers
- **Localization of products and services:**-knowing where the user is located at any given time and match service to them

## **Limitations of M-Commerce**

- Usability Problem: Small size of mobile devices (screens, keyboards, etc)
- limited storage capacity of devices
- insufficient bandwidth
- Speed
- Cost
- Accessibility

## **U-COMMERCE**

U-commerce extends traditional commerce to a world of ubiquitous networks and universal devices, a world in which users can access networks at any time from any place, using a range of devices to invoke unique and personalized services. Specifically, four constructs are discussed that form the fundamental dimensions of u-commerce: ubiquity, uniqueness, universality, and unison. It is proposed that future developments of information systems will be framed by these constructs.

- Ubiquitous = represents the ability to be connect at any time and in any place as well as the integration of human-computer interaction into most devices and processes, e.g. household objects = Ultimate form of (Reachability + Accessibility + Portability)
- Uniqueness = stands for the unique identification of each customer or user regarding his identity, current context, needs and location resulting in an individual service. = Ultimate form of (Localization + Identification + Portability)
- Universal = is related to everyone's devices which can be used multifunctional and as well as universal –you will always be connected no matter of your place. = Ultimate form of (Mobile Networks + Mobile Devices)
- Unison = constitutes the data integration across applications and devices to provide users consistent and fully access to required information independent of device and location. The term unison also relates to fully synchronised devices at any time. = Ultimate merge of (Mobile Applications + Data Synchronization)

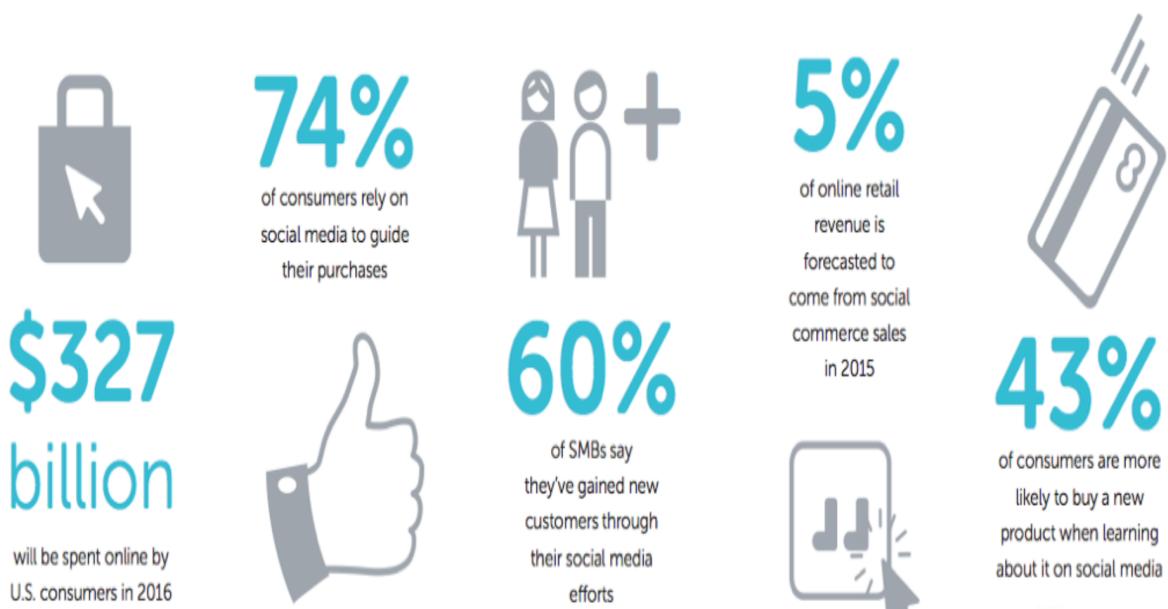
## **Social E-Commerce:**

Social ecommerce is when social media platforms are used to make a more personalized and targeted in-app experience shopping experience for customers. Simply put, it brings ecommerce functionality directly into social media platforms.

When customers are satisfied with your business, social media makes it easy for them to share and recommend your brand. Because of its very nature, social media is a place where content goes viral. These channels therefore play a very important role in your word-of-mouth marketing.

Examples of social commerce platforms and social commerce sites include Facebook business retail store pages where users can browse and shop without leaving the platform, or buy buttons on Twitter and Pinterest.

Many people wonder if social e-commerce will work for their business. In fact, it offers a myriad of business benefits for your brand. From increasing sales to driving traffic, to increasing customer engagement and website traffic.



### What is Local E-Commerce?

Local ecommerce (also known as hyper-local commerce) falls under the umbrella of Offline-to-Online commerce (O2O). O2O means that retailers with physical stores can (should) offer their inventory and sell to local online shoppers in the same way online pure plays sell to online shoppers. The terms don't actually make sense any more because even a physical store is now online and there are really no "offline" stores but we'll use it since it's a recognized term. Actually P2O or Physical-Online is more accurate.

It makes logical sense to sell to local customers before going out into the whole world. Many stores make the mistake of trying to sell online to the entire world before maximizing the local part. Local is typically your 50 mile radius around the location of your store — the distance where a shopper may actually drive or local delivery can be quickly provided. The radius depends on the population density around your store location so for example in Manhattan Local might be a 5 mile radius and in rural Idaho it might be 100 miles.

### **Local E-Commerce Strategy:**

- Bring your real-world experience to your online shopping.
- Videos can boost e-commerce and in-store sales and
- Fish where the fish are

## **Challenges in E-Commerce:**

- Finding the right products to sell
- Attracting the perfect customers
- Generating targeted traffic
- Converting shoppers into paying customers
- Retaining Customers
- Achieving profitable long-term growth
- Choosing the right technology and partners
- Attracting and hiring right people to make it all happen

## **Status of E-commerce in Nepal:**

Let's look at the global status first:

If we look at the status of E-Commerce Industry globally, the rate of using E-Commerce is increasing rapidly. If we look at the Report Published by United Nation Conference on Trade and Development. Global e-commerce sales grew 13% in 2017, hitting an estimated \$29 trillion. and the rate is increasing rapidly. For more information please have a look at <https://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=505>.

The following table shows the list of Top Ten countries by E-commerce sales, 2017. and in the later years the figure is increasing.

**Table 1: Top ten countries by E-commerce sales, 2017**

Rank	Economy	Total (\$ billion)	As a share (%) of GDP	B2B (\$ billion)	Share (%) of all e-commerce	B2C (\$ billion)	Annual average spent per online shopper (\$)
1	United States	8,883	46	8,129	90	753	3,851
2	Japan	2,975	61	2,828	95	147	3,248
3	China	1,931	16	869	49	1,062	2,574
4	Germany	1,503	41	1,414	92	88	1,668
5	Korea (Rep.)	1,290	84	1,220	95	69	2,983
6	United Kingdom	755	29	548	74	206	4,658
7	France	734	28	642	87	92	2,577
8	Canada	512	31	452	90	60	3,130
9	India	400	15	369	91	31	1,130
10	Italy	333	17	310	93	23	1,493
<b>Top 10 Total</b>		<b>19,315</b>	<b>36</b>	<b>16,782</b>	<b>87</b>	<b>2,533</b>	<b>2,904</b>
<b>World</b>		<b>29,367</b>		<b>25,516</b>		<b>3,851</b>	

Source: UNCTAD.

Now in the context of Nepal:

Now, talking about Status of E-Commerce in Nepal, as the popularity of E-Commerce is Increasing globally, so is in Nepal. Today, As of 2019, there are 31 private ISP's In Nepal with nearly 16.67 million internet users nationwide. And According to export.gov roughly 40% of these accounts are commercial. Online E-Commerce Activities is mainly concentrated on Kathmandu Valley and some major cities. However with the increase of internet penetration the number of mobile users are increasing in rural areas and so is online activities. Today there are many E-Commerce Websites that are providing e-commerce in Nepal along with delivery service. Below is the list of some of the top E-Commerce websites in Nepal.

Prepared by: Mr. Gokul Ghimire

List of Ecommerce website in Nepal:

**Daraz:** Daraz was founded in 2012 in Pakistan by a German Venture Capital Company, Rocket Internet as a fashion retailer . However, in 2015 daraz started operating with general marketplace strategy and business model in 2015, which means now, daraz was not only selling fashion products but also other general items Online. Daraz Started its service in Nepal after Daraz group acquired Kaymu, which was consumer-to-consumer online marketplace in South Asia. Later, in May 2018, Daraz group announced that it had been acquired by Alibaba Group for an undisclosed amount. Along with Nepal, Today Daraz is providing its logistic services in Pakistan, Bangladesh, Srilanka and Myanmar. With daraz you can order your favorite products along with the facility of delivery system. for more information please have a look at <https://www.daraz.com.np> . daraz.com.np has an Alexa Ranking of 46.6K among all the websites ranked globally.



**HamroBazar:** HamroBazar is another most popular Online E-Commerce Website. It is based on Consumer to Consumer(C2C) Business Model which means we can not only buy items but also sell our items. It enables individuals as well as companies to list wide varieties of new or used product online. It has Alexa Ranking of 60.4K. It was founded by Prabal Saakha who is also the Director of Saakha Group.



## **Overview of Electronic Transaction Act of Nepal**

ETA (Electronic Transaction Act) which deals with issues related to cybercrime and also help in making and implementing laws over cybercrime. It has made different requirements so that if anyone found having cybercrime, he/she will be punished according to the scene of the crime. He /she can be jailed for minimum from 6 months to a maximum of 3 years and has to pay the penalty according to the offense. However, the cybercrime has been overgrowing in Nepal because of an inadequate tracking system and the advancement needs still to build like in other developed countries. The lack of proper updates of ETA, the hackers again hacks the governmental confidentiality which is an embracing to tell.ETA yet hasn't adequately addressed Online payment, due to which we still don't have a fast and reliable online payment system too.

The most substantial challenge in the field of cyberlaw in Nepal is a challenge to implement cyber laws. For the implementation of the law, people over the internet in Nepal should have proper knowledge about the cybercrime and its consequences. Without an understanding of cyber crimes and regulation, people will have no awareness of them. Maintaining privacy in the cyberspace, creating strong passwords, updating the security software, updating password are some of the techniques to keep secure him /her.

Research More at:

<http://www.lawcommission.gov.np/>

Share your findings with the class.

## **UNIT 2: ECOMMERCE BUSINESS MODEL**

### **1. E-commerce Business Model Based on the Relationship of Transaction Parties.**

- **Business to Consumer (B2C)**
- **Business to Business (B2B)**
- **Consumer to Consumer (C2C)**
- **Consumer to Business (C2B)**

### **2. E-commerce Business Model Based on the Relationship of Transaction Types.**

- **Brokerage Model**
- **Aggregator Model**
- **Info-Mediatory Model**
- **Value Chain Model**
- **Community Model**
- **Advertisement Model**

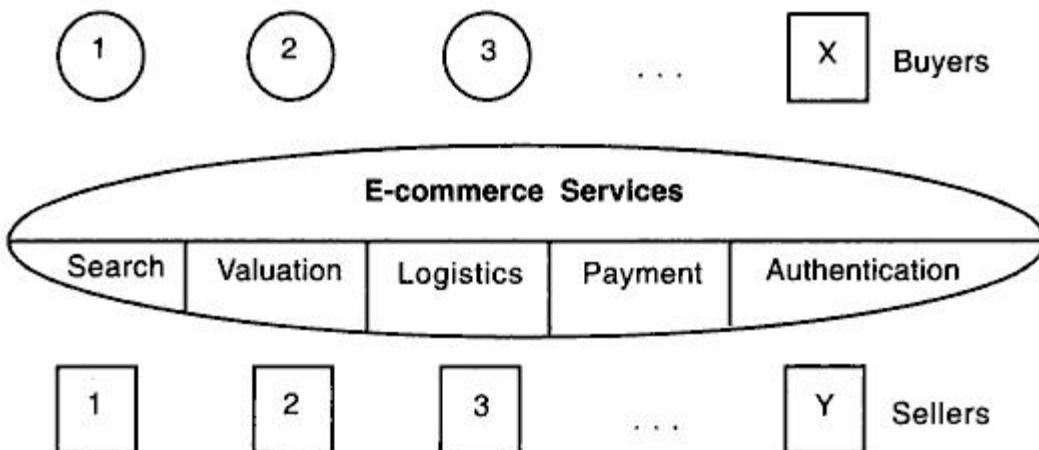
#### **Introduction to Business Model**

A business model is the method of doing business by which a company can sustain itself, that is, generate revenue. The business model spells out how a company makes money by specifying where it is positioned in the value chain.

Some models are quite simple. A company produces goods or services and sells it to customers. If all goes well, the revenues from sales exceed the cost of operation and the company realizes profit. Other models can be more complex. Radio and television broadcasting are a good example. The broadcaster is part of a complex network of distributors, content creators, advertisers, and listeners or viewers. Who makes money and how much, it is not always clear at the outset? The bottom line depends on many competing factors.

For our understanding, e-commerce can be defined as any form of business transaction in which the parties interact electronically.<sup>1</sup> A transaction in an electronic market represents a number of interactions between parties. For instance, it could involve several trading steps, such as marketing, ordering, payment, and support for delivery. An electronic market allows the participating sellers and buyers to exchange goods and services with the aid of information technology. Electronic markets have three main functions such as: (i) matching buyers and sellers, (ii) facilitating commercial transactions, and (iii) providing legal infrastructure. Information technology permeates all the three functions and also helps to increase market efficiency and reduce transaction costs.

The interaction between participants is supported by electronic trade processes that are basically search, valuation, payment and settlement, logistics, and authentication, as shown in Figure 2.1. The Internet and the World Wide Web allow companies to efficiently implement these key trading processes. For instance, many search services and brokers are available to help buyers find information, products, and merchants in electronic markets.



**Fig. 2.1 Representation of an electronic market.**

E-commerce can be formally defined as technology-mediated exchanges between parties (individuals, organizations, or both) as well as the electronically-based intra- or inter-organizational activities that facilitate such exchanges. It is global. It favors intangible things—ideas, information, and relationships. And it is intensely interlinked. These three attributes produce a new type of marketplace and society.

A company's business model is the way in which it conducts business in order to generate revenue. In the new economy, companies are creating new business models and reinventing old models. Reading the literature, we find business models categorized in different ways. Presently, there is no single, comprehensive and cogent taxonomy of Web business models that one can point to. Although there are many different ways to categorize e-business models, they can be broadly classified as follows:

- 1) E-Business models based on the relationship of Transaction Parties
- 2) E-Business models based on the relationship of Transaction Types

#### **E-Business models based on the relationship of Transaction Parties**

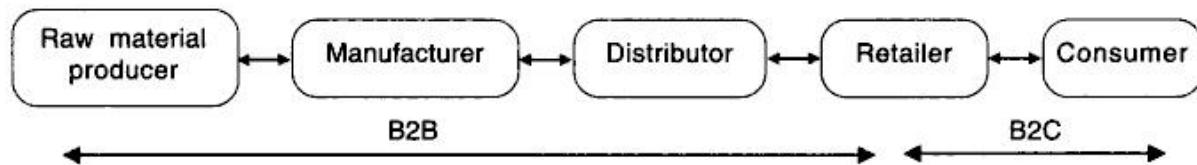
Electronic markets are emerging in various fields. Different industries have markets with different characteristics. For example, an information B2C market differs in many respects from the automotive B2B market.

The information B2C market represents companies that sell digital information goods, such as news, articles, music, books, or digital videos. In the information B2C market, the electronic infrastructure not only helps match customers and sellers, but also acts as the distribution channel, delivering products to customers.

In the automotive B2B market, the products traded, such as parts and components of cars, have a high degree of specificity. The market infrastructure used is to be mainly based on Electronic Data Interchange (EDI) over expensive VAN services. EDI involves the exchange of standardized, structured information between originations, permitting direct communication between computer systems. B2B is also a closed market in the sense that the number of participants involved in trading is limited and known a priori.

Understanding the nature of the market's requirements is critical for creating the underlying e-business

infrastructure. The relation between B2B and B2C models is clearly shown in Figure 2.3.



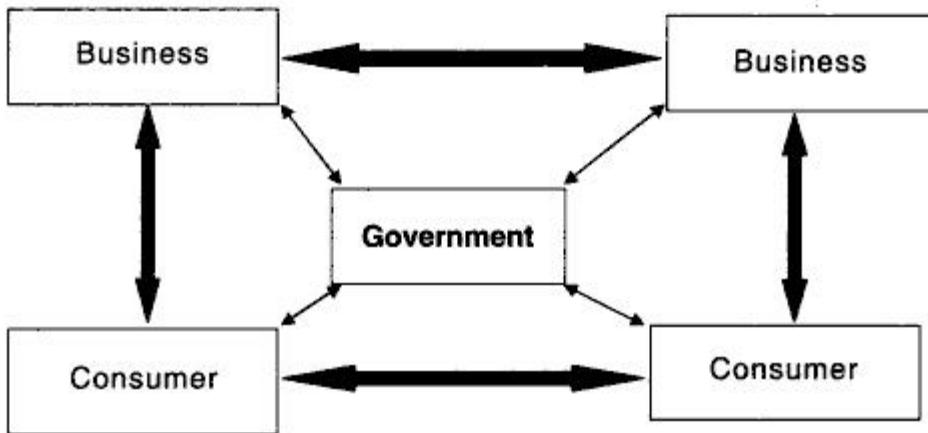
**Fig. 2.3** Relation between B2B and B2C models.

B2B covers business transactions along the various interactions existing in the value chain from producers of raw materials to retailers and consumers including manufacturers and distributors. On the contrary, B2C reflects only the interactions between a customer and a retailer. Basically, B2C transactions include the following steps: (i) account acquisition, (ii) product discovery through search and browse, (iii) price negotiation, (iv) payment, and (v) product delivery. In some cases, customer services may also exist.

**TABLE 2.1**  
SUMMARY OF E-BUSINESS TRANSACTION MODELS

<i>Model</i>	<i>Description</i>	<i>Examples</i>
B2C	Sells products or services directly to consumers.	<i>amazon.com, autobytel.com, eDiets.com, Pets.com</i>
B2B	Sells products or services to other businesses or brings multiple buyers and sellers together in a central marketplace.	<i>MetalSite.com, VerticalNet.com, SHOP2gether.com</i>
B2G	Businesses selling to local, state, and federal agencies.	<i>iGov.com</i>
C2C	Consumers sell directly to other consumers.	<i>ebay.com, InfoRocket.com</i>
C2B	Consumers fix price on their own, which businesses accept or decline.	<i>Priceline.com</i>

E-commerce can be classified according to the transaction partners such as **1) business to-consumer (B2C)**, **2) business-to-business (B2B)**, **3) business-to-government (B2G)**, **4) consumer to-consumer (C2C)**, and **5) consumer-to-business (C2B)**. Within these broad categories, there are a number of variations in the way the models are implemented. Table 2.1 summarizes some of the current e-business models. The contents of this table are illustrated in the form of a diagram in Figure 2.4.



**Fig. 2.4 E-business transaction model.**

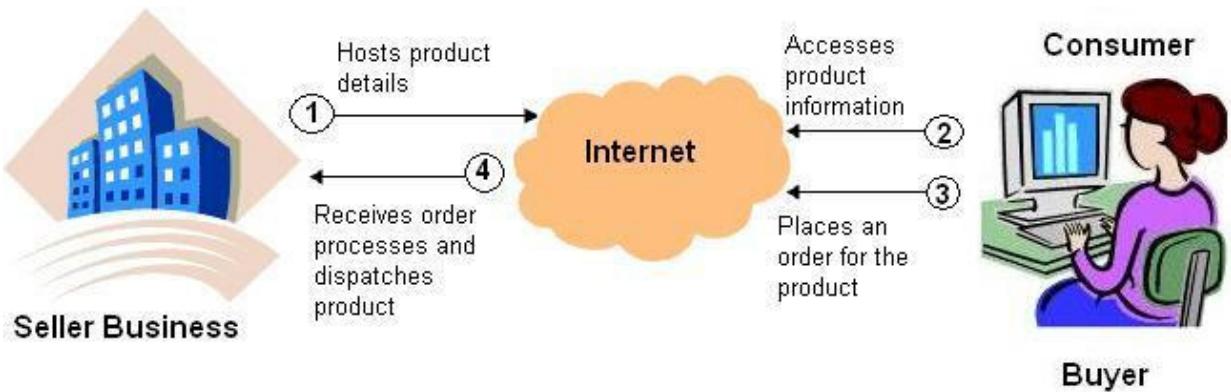
### 1) Business-to-Consumer (B2C)

The B2C model involves transactions between business organizations and consumers. It applies to any business organization that sells its products or services to consumers over the Internet. These sites display product information in an online catalog and store it in a database. The B2C model also includes services online banking, travel services, and health information and many more as shown in figure below.

Consumers are increasingly going online to shop for and purchase products, arrange financing, arrange shipment or take delivery of digital products such as software, and get service after the sale. B2C e-business includes retail sales, often called e-retail (or e-tail), and other online purchases such as airline tickets, entertainment venue tickets, hotel rooms, and shares of stock.

Some B2C e-businesses provide high-value content to consumers for a subscription fee. Examples of e-business following this subscription model include the Wall Street Journal (financial news and articles), Consumer Reports (product reviews and evaluations), and edieals.com (nutritional counseling).

B2C e-business models include virtual malls, which are websites that host many online merchants. Virtual malls typically charge setup, listing, or transaction fees to online merchants, and may include transaction handling services and marketing options. Examples of virtual malls include excite.com, choicemall, women.com, networkweb.com, amazon.com, Zshops.com, and yahoo.com.



### ***B2C Business Model***

E-tailers that offer traditional or Web-specific products or services only over the Internet are sometimes called virtual merchants, and provide another variation on the B2C model. Examples of virtual merchants include amazon.com (books, electronics, toys, and music), eToys.com (children's books and toys), and ashford.com (personal accessories).

Some businesses supplement a successful traditional mail-order business with an online shopping site, or move completely to Web-based ordering. These businesses are sometimes called catalogue merchants. Examples include avan.com (cosmetics and fragrances), chefs (cookware and kitchen accessories), Omaha Steaks (premium steaks, meats, and other gourmet food), and Harry and David (gourmet food gifts).

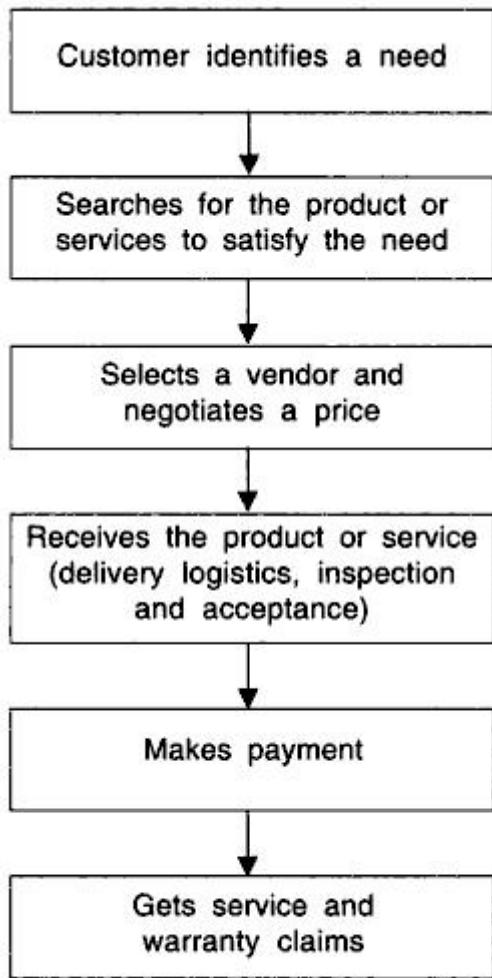
Many people were very excited about the use of B2C on the Internet, because this new communication medium allowed businesses and consumers to get connected in entirely new ways. The opportunities and the challenges posed by the B2C e-commerce are enormous. A large amount of investment has gone into this and many sites have either come up or are coming up daily to tap this growing market.

Some of the reasons why one should opt for B2C are:

- 1) Inexpensive costs, big opportunities. Once on the Internet, opportunities are immense as companies can market their products to the whole world without much additional cost.
- 2) Globalization. Even being in a small company, the Web can make you appear to be a big player which simply means that the playing field has been levelled by e-business. The Internet is accessed by millions of people around the world, and definitely, they are all potential customers.
- 3) Reduced operational costs. Selling through the Web means cutting down on paper costs, customer support costs, advertising costs, and order processing costs.
- 4) Customer convenience. Searchable content, shopping carts, promotions, and interactive and user-friendly interfaces facilitate customer convenience. Thus, generating more business. Customers can also see order status, delivery status, and get their receipts online.
- 5) Knowledge management. Through database systems and information management, you can find out who visited your site, and how to create better value for customers.

### **Processes in B2C (How Does B2C Work?)**

B2C e-commerce is more than just an online store. It really is about managing the entire process, but just using technology as a tool for order processing and customer support. Figure 2.5 depicts the processes in B2C.



**Fig. 2.5 Processes in B2C.**

The B2C process is now explained in greater details:

- 1) **Visiting the virtual mall.** The customer visits the mall by browsing the online catalogue—a very organized manner of displaying products and their related information such as price, description, and availability. Finding the right product becomes easy by using a keyword search engine. Virtual malls may include a basic to an advanced search engine, product rating system, content management, customer support systems, bulletin boards, newsletters and other components which make shopping convenient for shoppers.
- 2) **Customer registers.** The customer has to register to become part of the site's shopper registry. This allows the customer to avail of the shop's complete services. The customer becomes a part of the company's growing database and can use the same for knowledge management and data mining.
- 3) **Customer buys products.** Through a shopping cart system, order details, shipping charges, taxes, additional charges and price totals are presented in an organized manner. The customer can even change the quantity of a certain product. Virtual malls have a very comprehensive shopping system, complete with check-out forms.
- 4) **Merchant processes the order.** The merchant then processes the order that is received from the

previous stage and fills up the necessary forms.

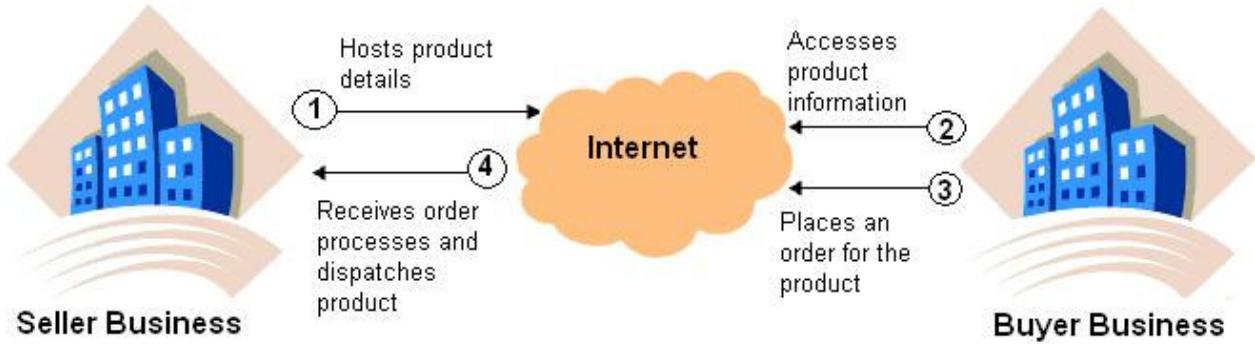
- 5) **Credit card is processed.** The credit card of the customer is authenticated through a payment gateway or a bank. Other payment methods can be used as well, such as debit cards, prepaid cards, or bank-to-bank transfers.
- 6) **Operations management.** When the order is passed on to the logistics people, the traditional business operations will still be used. Things like inventory management, total quality management, warehousing, optimization and project management should still be incorporated even though it is an e-business. Getting the product to the customer is still the most important aspect of e-commerce.
- 7) **Shipment and delivery.** The product is then shipped to the customer. The customer can track the order/delivery as virtual malls have a delivery tracking module on the website which allows a customer to check the status of a particular order.
- 8) **Customer receives.** The product is received by the customer, and is verified. The system should then tell the firm that the order has been fulfilled.
- 9) **After-sales service.** After the sale has been made, the firm has to make sure that it maintains a good relationship with its customers. This is done through customer relationship management or CRM.

The example of the [www.amazon.com](http://www.amazon.com) site also involves the B2C model in which the consumer searches for a book on their site and places an order, if required. This implies that a complete business solution might be an integration solution of more than one business model. For example, [www.amazon.com](http://www.amazon.com) includes the B2B model in which the publishers transact with Amazon and the B2C model in which an individual consumer transact with the business organization. The B2C model of e-commerce is more prone to the security threats because individual consumers provide their credit card and personal information on the site of a business organization. In addition, the consumer might doubt that his information is secured and used effectively by the business organization. This is the main reason why the B2C model is not very widely accepted. Therefore, it becomes very essential for the business organizations to provide robust security mechanisms that can guarantee a consumer for securing his/her information.

## 2) Business to Business (B2B)

The B2B model involves electronic transactions for ordering, purchasing, as well as other administrative tasks between business houses. It includes trading goods, such as business subscriptions, professional services, manufacturing, and wholesale dealings. Sometimes in the B2B model, business may exist between virtual companies, neither of which may have any physical existence. In such cases, business is conducted only through the Internet.

Let us look at the example of [www.amazon.com](http://www.amazon.com). As you know, [www.amazon.com](http://www.amazon.com) is an online bookstore that sells books from various publishers including Wrox, O'Reilly, Premier Press, and so on. In this case, the publishers have the option of either developing their own site or displaying their books on the Amazon site ([www.amazon.com](http://www.amazon.com)), or both. The publishers mainly choose to display their books on [www.amazon.com](http://www.amazon.com) as it gives them a larger audience. Now, to do this, the publishers need to transact with Amazon, involving business houses on both the ends, is the B2B model as shown in figure below.



### **B2B Business Model**

Thus, B2B is that model of e-commerce whereby a company conducts its trading and other commercial activity through the Internet and the customer is another business itself. This essentially means commercial activity between companies through the Internet as a medium.

This is supposed to be a huge opportunity area on the Web. Companies have by and large computerized all the operations worldwide and now they need to go into the next stage by linking their customers and vendors. This is done by supply chain software, which is an integral part of your ERP application. Companies need to set up a backbone of B2B applications, which will support the customer requirements on the Web. Many B2B sites are company and industry specific, catering to a community of users, or are a combination of forward and backward integration. Companies have achieved huge savings in distribution-related costs due to their B2B applications.

#### Major Advantages of B2B

- 1) **Direct interaction with customers.** This is the greatest advantage of e-business.
- 2) **Focussed sales promotion.** This information gives authentic data about the likes, dislikes and preferences of clients and thus helps the company bring out focussed sales promotion drives which are aimed at the right audience.
- 3) **Building customer loyalty.** It has been observed that online customers can be more loyal than other customers if they are made to feel special and their distinct identity is recognized and their concerns about privacy are respected. It has also been found that once the customers develop a binding relationship with a site and its product, they do not like to shift loyalties to another site or product.
- 4) **Scalability.** This means that the Web is open and offers round-the-clock access. This provides an access never known before, to the customer. This access is across locations and time zones. Thus a company is able to handle many more customers on a much wider geographical spread if it uses

an e-business model. The company can set up a generic parent site for all locations and make regional domains to suit such requirements. Microsoft is using this model very successfully.

- 5) **Savings in distribution costs.** A company can make huge savings in distribution, logistical and after-sales support costs by using e-business models. Typical examples are of computer companies, airlines, and telecom companies.

#### Processes for Business-to-Business Transactions and Models

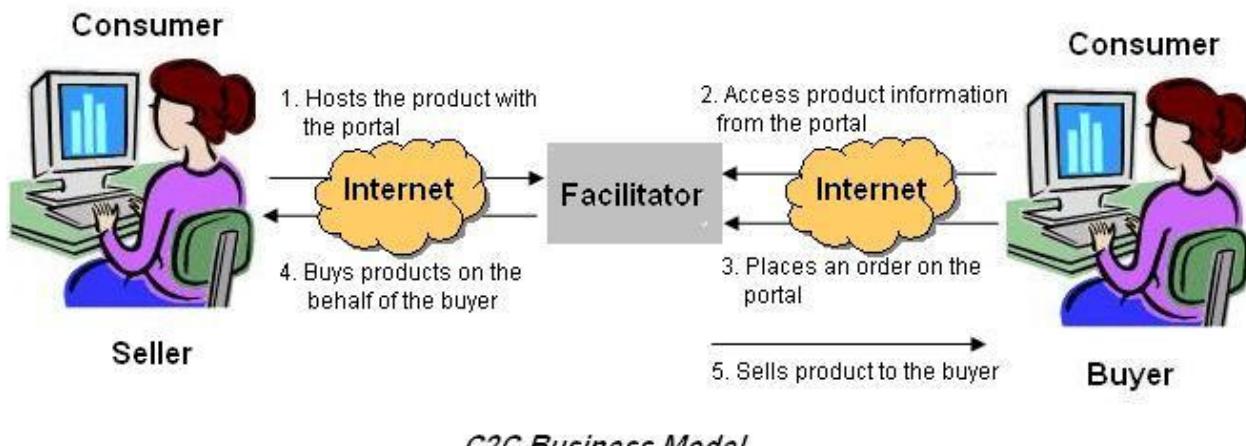
B2B interactions involve much more complexity than B2C. For instance, typical B2B transactions include, among others, the following steps:

- (i) review catalogues,
- (ii) identify specifications.
- (iii) define requirements,
- (iv) post request for proposals (REP).
- (v) review vendor reputation.
- (vi) select vendor.
- (vii) fill out purchase orders (PO).
- (viii) send PO to vendor,
- (ix) prepare invoice,
- (x) make payment,
- (xi) arrange shipment, and
- (xii) organize product inspection and reception.

Due to the large number of transactions involved, business-to-business operations can be too risky if e-business sites cannot guarantee adequate quality of service in terms of performance, availability, and security.

### 3) Consumer to Consumer (C2C)

The C2C model involves transaction between consumers. Here, a consumer sells directly to another consumer. eBay and www.bazee.com are common examples of online auction Web sites that provide a consumer to advertise and sell their products online to another consumer. However, it is essential that both the seller and the buyer must register with the auction site. While the seller needs to pay a fixed fee to the online auction house to sell their products, the buyer can bid without paying any fee. The site brings the buyer and seller together to conduct deals as shown in figure below.

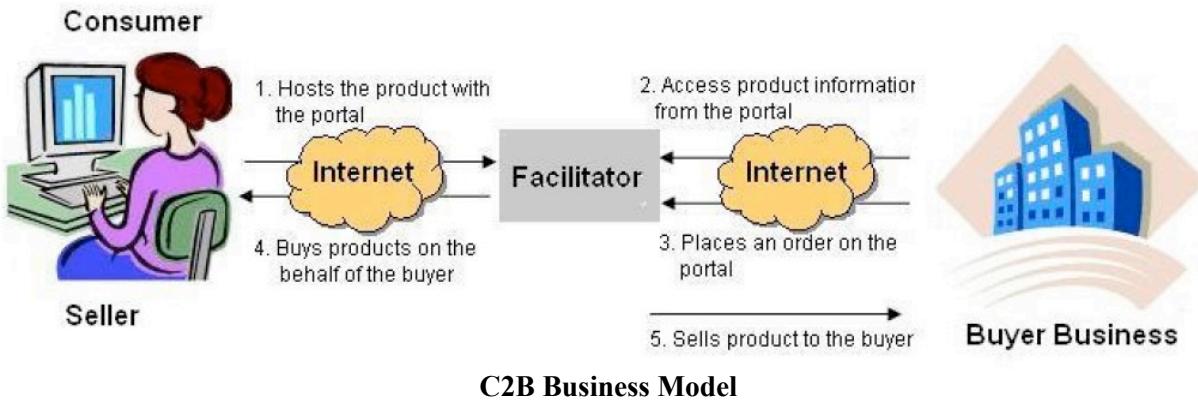


Let us now look at the previous figure with respect to eBay. When a customer plans to sell his products to other customers on the Web site of eBay, he first needs to interact with an eBay site, which in this case acts as a facilitator of the overall transaction. Then, the seller can host his product on [www.ebay.com](http://www.ebay.com), which in turn charges him for this. Any buyer can now browse the site of eBay to search for the product he interested in. If the buyer comes across such a product, he places an order for the same on the Web site of eBay. eBay now purchase the product from the seller and then, sells it to the buyer. In this way, though the transaction is between two customers, an organization acts as an interface between the two organizations.

There are also a number of new consumer-to-consumer expert information exchanges that are expected to generate \$6 billion in revenue by 2005. Some of these exchanges, such as AskMe.com and abuzz, are free, and some allow their experts to negotiate fees with clients. InfoRocket.com, one of the first question-and-answer marketplaces, is driven by a person-to-person auction format. The InfoRocket.com bidding system allows a person who submits a question to review the profiles of the "experts" who offer to answer the question. When the person asking the question accepts an "expert" offer, infoRocket.com bills the person's credit card, delivers the answer, and takes a 20 percent commission.

#### 4) Consumer to Business (C2B)

The C2B model involves a transaction that is conducted between a consumer and a business organization. It is similar to the B2C model, however, the difference is that in this case the consumer is the seller and the business organization is the buyer. In this kind of a transaction, the consumers decide the price of a particular product rather than the supplier. This category includes individuals who sell products and services to organizations. For example, [www.monster.com](http://www.monster.com) is a Web site on which a consumer can post his bio-data for the services he can offer. Any business organization that is interested in deploying the services of the consumer can contact him and then employ him, if suitable as shown in figure.



Let us look at another example of the C2B model. William Ward needs to buy an airline ticket for his journey from New York to New Jersey. William needs to travel immediately. Therefore, he searches a Web site for a ticket. The Web site offers bidding facility to people who want to buy tickets immediately. On the Web site, William quotes the highest price and gets the ticket.

In addition to the models discussed so far, five new models are being worked on that involves transactions between the government and other entities, such as consumer, business organizations, and other governments. All these transactions that involve government as one entity are called e-governance. The various models in the e-governance scenario are:

- **Government-to-Government (G2G) model:** This model involves transactions between 2 governments. For example, if the American government wants to buy oil from the Arabian government, the transaction involved are categorized in the G2G model.
- **Government-to-Consumer (G2C) model:** In this model, the government transacts with an individual consumer. For example, a government can enforce laws pertaining to tax payments on individual consumers over the Internet by using the G2C model.
- **Consumer-to-Government (C2G) model:** In this model, an individual consumer interacts with the government. For example, a consumer can pay his income tax or house tax online. The transactions involved in this case are C2G transactions.
- **Government-to-Business (G2B) model:** This model involves transactions between a government and business organizations. For example, the government plans to build a fly over. For this, the government requests for tenders from various contractors. Government can do this over the Internet by using the G2B model.
- **Business-to-Government (B2G) model:** In this model, the business houses transact with the government over the Internet. For example, similar to an individual consumer, business houses can also pay their taxes on the Internet.

## **E-Business models based on the relationship of Transaction Types**

Based on transaction type, different types of transactions can be identified as listed below:

- Brokerage
- Aggregator
- Info-mediatory
- Community
- Value chain
- Advertising

These transaction types take place in a variety of ways. Moreover, any given firm may combine one or two of these as part of its web business strategy.

### **1) Brokerage Model**

Brokers are market-makers: they bring buyers and sellers together and facilitate transactions. Brokers play a frequent role in business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C) markets. Usually a broker charges a fee or commission for each transaction it enables. The formula for fees can vary depending on context. Brokerage models include:

**Marketplace Exchange** -- offers a full range of services covering the transaction process, from market assessment to negotiation and fulfillment. Some examples are [Orbitz, ChemConnect]

**Buy/Sell Fulfillment** -- takes customer orders to buy or sell a product or service, including terms like price and delivery. Some examples are [CarsDirect, Respond.com]

**Auction Broker** -- conducts auctions for sellers (individuals or merchants). Broker charges the seller a listing fee and commission scaled with the value of the transaction. Auctions vary widely in terms of the offering and bidding rules. Some examples are [eBay]

**Transaction Broker** -- provides a third-party payment mechanism for buyers and sellers to settle a transaction. Some examples are [PayPal, Escrow.com]

**Search Agent** -- a software agent or "robot" used to search-out the price and availability for a good or service specified by the buyer, or to locate hard to find information.

**Virtual Marketplace** -- or virtual mall, a hosting service for online merchants that charges setup, monthly listing, and/or transaction fees. It may also provide automated transaction and relationship marketing services. Some examples are [zShops and Merchant Services at Amazon.com]

### **2) Aggregator Model**

Electronic commerce business model where a firm (that does not produce or warehouses any item) collects (aggregates) information on goods and/or services from several competing sources at its website. The firm's strength lies in its ability to create an 'environment' which draws visitors to its website, and in designing a system which allows easy matching of prices and specifications. Aggregator model includes:

**Virtual Merchant** -- this is a business that operate only from the web and offers either traditional or web specific goods and services. The method of selling may be listing price or auction. Some example includes [Amazon, toys]

**Catalog Merchant** – Catalog business is a migration of mail order to web-based order business.

**Bit Vendor** – This is the merchant that deals strictly in digital products and services in its purest form.

**Subscription model** – the users have to pay for the access of the site. High value-added content should be essential for subscription model. Some examples are [Wall street journal, Consumer Reports]

### 3) Info-mediatory Model

Data about consumers and their consumption habits are valuable, especially when that information is carefully analyzed and used to target marketing campaigns. Independently collected data about producers and their products are useful to consumers when considering a purchase. Some firms function as infomediaries (information intermediaries) assisting buyers and/or sellers understand a given market. Info-mediatory model includes:

**Advertising Networks** -- feed banner ads to a network of member sites, thereby enabling advertisers to deploy large marketing campaigns. Ad networks collect data about web users that can be used to analyze marketing effectiveness. [DoubleClick]

**Audience Measurement Services** -- online audience market research agencies. [Nielsen//Net ratings]

**Incentive Marketing** -- customer loyalty program that provides incentives to customers such as redeemable points or coupons for making purchases from associated retailers. Data collected about users is sold for targeted advertising. [Cool savings]

**Meta-Mediatory** -- facilitates transactions between buyer and sellers by providing comprehensive information and ancillary services, without being involved in the actual exchange of goods or services between the parties. [Edmunds]

### 4) Community Model

The viability of the community model is based on user loyalty. Users have a high investment in both time and emotion. Revenue can be based on the sale of ancillary products and services or voluntary contributions; or revenue may be tied to contextual advertising and subscriptions for premium services. The Internet is inherently suited to community business models and today this is one of the more fertile areas of development, as seen in rise of social networking.

**Open Source** -- software developed collaboratively by a global community of programmers who share code openly. Some examples are [Red Hat, Linux]

**Open Content** -- openly accessible content developed collaboratively by a global community of contributors who work voluntarily. [Wikipedia]

**Public Broadcasting** -- user-supported model used by not-for-profit radio and television broadcasting extended to the web. A community of users support the site through voluntary donations. [The Classical

Station (WCPE.org)]

**Social Networking Services** -- sites that provide individuals with the ability to connect to other individuals along a defined common interest (professional, hobby, romance). Social networking services can provide opportunities for contextual advertising and subscriptions for premium services. [Facebook, Orkut]

### 5) Value Chain Model

Value chain selling is supported through two business models: demand chain and a supply chain; E-Commerce supports the transactions through both the demand chain business model and supply chain business model.

Products, goods, services, or information are delivered through the parties of the value chain from producers to end users. A value chain also has relationship and administrative aspects, that is, you can manage the relationship of the partners or enterprises in your value chain, as well as offer some administrative services to those parties.

As a result, value chain business models must manage the two sides of their businesses: their customers and direct sales, and their channel partners and suppliers. Each requires its own management channels and practices.

To sell directly to customers (direct sales), value chain models usually include a storefront, where customers can purchase their goods or services directly. To manage relationships with partners or suppliers, the demand chain and a supply chain models within the value chain include a hub.

### 6) Advertising Model

The web advertising model is an extension of the traditional media broadcast model. The broadcaster, in this case, a web site, provides content (usually, but not necessarily, for free) and services (like email, IM, blogs) mixed with advertising messages in the form of banner ads. The banner ads may be the major or sole source of revenue for the broadcaster. The advertising model works best when the volume of viewer traffic is large or highly specialized. Advertising model includes:

**Portal** -- usually a search engine that may include varied content or services. A high volume of user traffic makes advertising profitable and permits further diversification of site services. Some common examples are [Google, Yahoo!]

**Classifieds** -- list items for sale or wanted for purchase. Listing fees are common, but there also may be a membership fee. [Monster.com, Craigslist]

**User Registration** -- content-based sites that are free to access but require users to register and provide demographic data. Registration allows inter-session tracking of user surfing habits and thereby generates data of potential value in targeted advertising campaigns. [NYTimes]

**Contextual Advertising / Behavioral Marketing** -- For example, a browser extension that automates authentication and form fill-ins, also delivers advertising links or pop-ups as the user surfs the web. Contextual advertisers can sell targeted advertising based on an individual user's surfing activity.

## **E-Business/Revenue Model:**

In business, revenue typically consists of the total amount of money received by the company for goods sold or services provided during a certain time period. Therefore, revenue models are a part of the business model. Many online companies generate revenues from multiple income streams such as advertising, subscription, affiliate marketing etc. Online models not only sell goods or services but also contacts (e.g. banner) and information (e.g. user-data).

Five primary revenue models are described below. Since there are possibilities of multiple variations, many companies do not use one single revenue model

### **1. Transaction fee model:**

A company receives commissions based on volume for enabling or executing transactions. The revenue is generated through transaction fees by the customer paying a fee for a transaction to the operator of a platform. The company is a market place operator providing the customer with a platform to place his transactions. Example: eBay

### **2. Subscription Fee model:**

Users are charged a periodic (daily, monthly or annual) fee to subscribe to a service. Many sites combine free content with premium membership, i.e. subscriber- or member-only content. Subscription fees do not depend on transactions. Subscribers use the content as long and often as they want. E.g.: online journal/magazine such as New York times, daily mail etc.

### **3. Advertisement model:**

Typically, fees are generated from advertisers in exchange for advertisements, which is ultimately the classic principal among the revenue models besides sales. Even if representatives of major media companies complain about earning less money with online advertising than with advertising in print or TV.

### **4. Sales Revenue model:**

Wholesalers and retailers of goods and services sell their products online. The main benefits for the customer are the convenience, time savings, fast information etc. The prices are often more competitive. In terms of online sales there are different models such as market places as common entry points for various products from multiple vendors.

### **5. Affiliate model:** Commission is taken for referring customer to other site or party.

## B2C Business Model:

Retail: businesses that sells to customers. The grouping can be further distinguished in many, sometime overlapping, ways but below is common one:

### What is Electronic Retailing (E-tailing)?

**Electronic retailing (E-tailing) is the sale of goods and services through the internet. E-tailing can include business to business (B2B) and business to consumer (B2C) sales of products and services. E-tailing requires companies to tailor the business models to capture internet sales, which can include building out distribution channels such as warehouses, internet webpages, and product shipping center.**

### Types of Electronic Retailing (E-tailing)

#### Business-to-Consumer (B2C) E-Tailing

**Business-to-consumer retailing** is the most common of all e-commerce companies and the most familiar to most Internet users. This group of retailers includes companies selling finished goods or products to consumers online directly through their websites. The products could be shipped and delivered from the company's warehouse or directly from the manufacturer. One of the primary requirements of a successful B2C retailer is maintaining good customer relations.

#### Business-to-Business (B2B) E-Tailing

Business-to-business retailing involves companies that sell to other companies. Such retailers include consultants, software developers, freelancers, and **wholesalers**. Wholesalers sell their products in bulk from their manufacturing plants to businesses. These businesses, in turn, sell those products to consumers. In other words, a B2B company such as a wholesaler might sell products to a B2C company.

## Community Provider:

It is a social network that brings together people with the same interests and allows sharing content, communication etc. The profit is gained by advertising payments, subscription commissions, sales revenues, transaction fees, affiliate fees.

Example: Twitter.

## Content Provider

a platform that contains digital content, such as music, video, photos etc. The profit is gained by subscription commission, advertising or download payments.

## **Portals**

It is a platform that combines content (such as news, meteorological outlooks, rates of currency etc) and services (community forum, downloads, chat, entertainment etc). The owner gets profit due to advertising, subscription and transaction payments.

Example: Google Service.

## **Transaction Brokers**

Transaction Brokers help get things done more quickly and cheaply. process online transactions usually conducted in person by phone or e-mail. The owner gets profits via transaction payments.

Example PayPal, Open Table and Commerce Bancorp.

## **Market Creators**

Market Creators use internet technology to create markets that bring buyers and sellers together. uses Internet technology to develop markets that connect buyers and sellers. The revenue is got by transaction commissions.

Example: eBay.

## **Service Providers**

provides services that save time, are convenient or cheaper alternatives to common service providers. Owners get profit via subscription fees, advertising, sales of services.

Example: Tootle.

## **B2B: Business to Business**

Grouping.

## **E-Distributor**

These are companies that provide goods and services directly to sole businesses and make profits via this activity. These companies are run by a firm that wants to work for many customers.

Example: CISCO.

## **E-Procurement**

These firms create and sell access to digital e-markets. They make profits by transaction commissions, payments based on the number of computers using the service or annual licensing payments and are usually named as application service providers

## **Digital Exchanges**

Digital exchanges are electronic marketplace where hundreds of suppliers meet large commercial purchasers. Example: Liquidation.com

## **Industrial Consortia**

Industrial Consortia are industry-owned vertical marketplaces that serve specific industries.

### **Private Industrial Networks:**

Private Industrial Networks or Private Trading Exchanges are digital networks that coordinate the flow of information between companies that do business together.

They Constitute some 75% of all B2B expenditures by large companies. Example: Walmart.

#### Single Firm Network:

They are the most widespread and are run wholly by a one large purchasing company. Joining in is by offering only to a long-term supplier of direct inputs.

#### Industry-wide Network:

These are networks controlled by a consortium of large companies in a field and their goals are:

- Provide a neutral set of standards for commercial communication;
- Shared and open technology platforms for solving problem within a field;
- Collaborative activities.

## **What is Electronic Data Interchange (EDI)?**

Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents in a standard electronic format between business partners.

Electronic Data Interchange (EDI) is the electronic interchange of business information using a standardized format; a process which allows one company to send information to another company electronically rather than with paper. Business entities conducting business electronically are called trading partners.

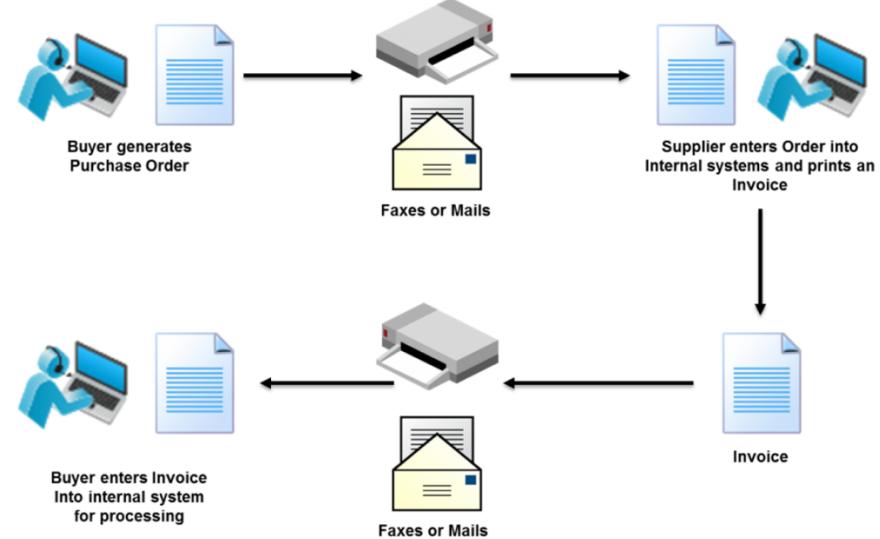
Many business documents can be exchanged using EDI, but the two most common are purchase orders and invoices. At a minimum, EDI replaces the mail preparation and handling associated with traditional business communication. However, the real power of EDI is that it standardizes the information communicated in business documents, which makes possible a "paperless" exchange.

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.

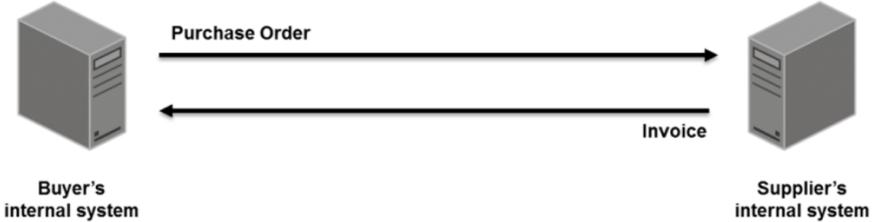
Each term in the definition is significant:

- **Computer-to-Computer**

EDI replaces postal mail, fax and email. While email is also an electronic approach, the documents exchanged via email must still be handled by people rather than computers. Having people involved slows down the processing of the documents and also introduces errors. Instead, EDI documents can flow straight through to the appropriate application on the receiver's computer (e.g., the Order Management System) and processing can begin immediately. A typical manual process looks like this, with lots of paper and people involvement:



The EDI process looks like this — no paper, no people involved:



- **Business documents:** These are any of the documents that are typically exchanged between businesses. The most common documents exchanged via EDI are purchase orders, invoices and advance ship notices. But there are many, many others such as bill of lading, customs documents, inventory documents, shipping status documents and payment documents.
- **Standard Format:**  
Because 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. A standard format describes what each piece of information is and in what format (e.g., integer, decimal, mmddyy). Without a standard format, each company would send documents using its company-specific format and, much as an English-speaking person probably doesn't understand Japanese, the receiver's computer system doesn't understand the company-specific format of the sender's format.
  - There are several EDI standards in use today, including ANSI, EDIFACT, TRADACOMS and ebXML. And, for each standard there are many different versions, e.g., ANSI 5010 or EDIFACT version D12, Release A. When two businesses decide to exchange EDI documents, they must agree on the specific EDI standard and version.
  - Businesses typically use an EDI translator – either as in-house software or via an EDI service provider – to translate the EDI format so the data can be used by their internal applications and thus enable straight through processing of documents

- Business Partners:  
The exchange of EDI documents is typically between two different companies, referred to as business partners or trading partners. For example, Company A may buy goods from Company B. Company A sends orders to Company B. Company A and Company B are business partners.

EDI Layered Architecture:

Generally, EDI Architecture specifies four layers:

- I. Semantic (Application) Layer.
- II. Standard (Transaction) Layer.
- III. Packing (Transport) Layer.
- IV. Physical Infrastructure Layer.

EDI Semantic Layer	Application Layer Service	
EDI Standard Layer	EDI fact Business form standards.	
	ANSI X12 business form standards.	
EDI Transport Layer	Electronic Mail	X 435 MIME
	Point to Point	FTP, TELENET
	WWW	HTTP
Physical Infrastructure Layer	Dialup Lines, Internet, I-way	

**EDI-** EDI is a form of E-Commerce is a standard format for exchanging electronic data.

Electronic Data Interchange is the interchanging of standard formatted data between computer application systems of trading partners with minimal manual intervention.

Tangible Benefits of EDI-

1. EDI is time saving system which transfer business information from one computer to another automatically and reduces errors quickly.
2. EDI is a cost saving system that allow minimum cost transaction to its business partners and also produces acknowledgement at the receiving of data.
3. EDI handles all paper work such as (maintaining data, filing cabinets) since it takes all transactions in paper form and also reduce the postal charges.
4. EDI check Data Entry errors, improve business services.
5. It builds a bridge among manufacturers, retailers, suppliers.
6. EDI has also linked with international trade which left the long standing trade restrictions.

IT is the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents or business data from one computer system to another computer system, i.e. from one trading partner to another trading partner without human intervention.

Architecture of EDI- The architecture of EDI is divided into four layers-

1. Application Layer
2. Standards translation Layer
3. Transport Layer
4. Physical Network Infrastructure Layer

1. Application Layer- The first layer of EDI defines the business applications that are used by EDI. This layer of EDI translates business application into request for quotes, purchase orders, acknowledgement and invoices. For every company this layer is specific and also for the software that company uses. The application layer also called the semantic layer. The Semantic layer describes the

Business application that is driving EDI. For a procurement application, this translates into request for quotes, price purchase orders, acknowledgements, and invoice. This layer is specific to a company, and the software it uses. i.e. the user interface and content visible on the screen are tailored or customized to local environment. By the semantic layer of the EDI the companies form are change into more specific format and then it may be send to various partners of the company have a several software applications to handle all forms aspects. To achieve all above activities the company must follow the EDI standard ex. of EDI standards are X12, ANSI, EDIFACT etc. If the sender and receivers of company want to exchange some files then requires a compatible standards of Electronic Data Interchange. The Sender who want to send a data use a software application with EDI and exchange data in EDI format so that at the receivers end the receiver can read it. The EDI standards are very important in exchange of data because at sending end a sender manipulate data by EDI as in receiving end data is manipulated by EDI.

2. Standard Layer- This layer of EDI architecture defines the structures of the business form and some content which are related with the application layer. This layer of EDI has no mean without application layer so we can say that EDI applications and standard layer are interlinked.

3. Transport Layer- EDI transport layer is a non electronic way of sending the business form from one company to another company. This non electronic way may be registered mail, postal services or private career, telecommunications, fax etc. Now a days the transportation method is more complex with compare to e-mail.

4. physical Layer- The physical layer of EDI also called the infrastructure layer. This layer defined the component communication path for EDI data transaction. What are the structure of e-commerce supported EDI in which information can be build and what are the communication established over which EDI data transfer from one customer to another customers.

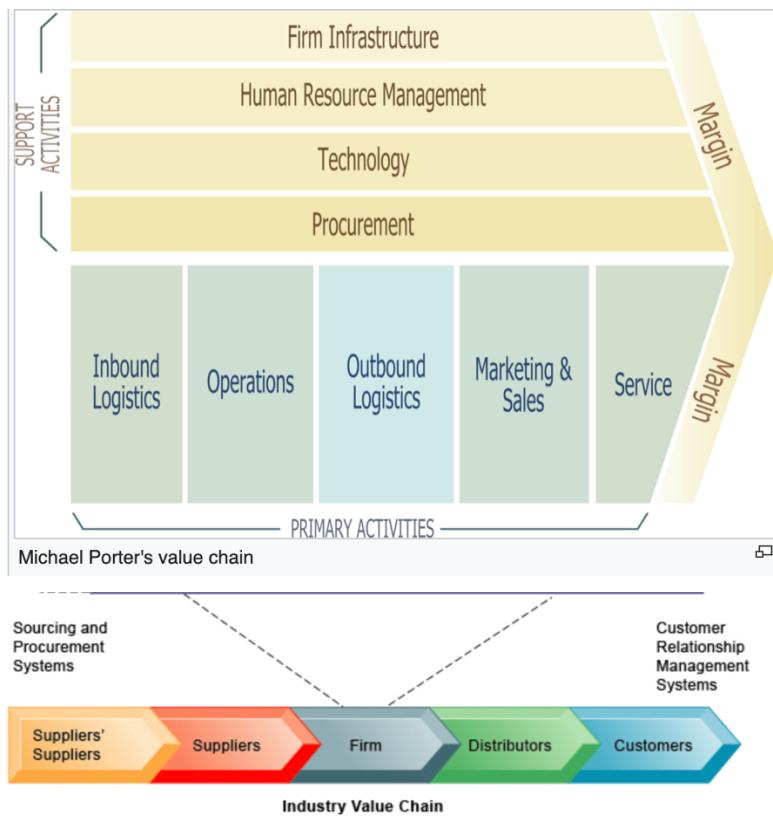
EDI involves exchanging data between in-house applications and applications at other companies; comprehensive middleware architecture often includes it. EDI can be formally defined as the transfer of structured data, by agreed message standards, from one computer system to another without human intervention. EDI might be considered "middleware", it also shares characteristics with applications in their own right. Although it lies between applications like other middleware, the applications to one side of it do not belong to your company! The whole point of EDI is to enable your company to communicate with other applications that are: 1. Always on the distal end of some long-distance link, and 2. Always "black boxes" from the viewpoint of your own network and applications. The whole point of EDI is to make data exchange possible with applications whose nature you cannot know, and whose behavior you cannot control. This makes EDI a special case of middleware, one better treated as an application (a suite of applications) unto itself

## **EDI in Ecommerce**

## E-Commerce & Industry Value Chain

### Value Chain Model

A value chain for a product is the chain of action that are performed by the business to add value in creating and delivering the product. For example, when you buy a product in a store or from the web, the value chain includes the business selecting products to be sold, purchasing the components or tools necessary to build them from a wholesaler or manufacturer, arranging the display, marketing and advertising the product and delivering the product to the client.



The value chain model as originally demonstrated by Porter (1985), identifies nine strategically relevant activities that create value and reduce cost in a specific business. These nine value-creating activities consist of five primary activities and four support activities. The primary activities represent the sequence of bringing materials into the business (Inbound logistics), converting them into final products (operation), shipping out final products (outbound logistics), marketing and service.

The support activities include:

- Procurement
- Technology department
- Human resource management
- Firm infrastructure.

This model is very helpful for identifying specific activities in business where competitive strategies can be applied and where information systems are most likely to have a strategic impact. Successful implementation of ecommerce in an organization should be based on thorough understanding of the areas in the value chain where ecommerce can add value most. More importantly, to succeed in gaining competitive advantage, ecommerce is to be based on the overall corporate strategy. Among a host of critical areas/ factors in the value chain the major organization have taken into consideration for establishing the sound ecommerce strategy include the role of intermediaries, value pricing, logistics/purchasing, fulfillment, and value nets among other.

### **What is Firms Value Chain?**

In value chain analysis, analysts examine the flow of raw materials to the point of sale to ensure that value exceeds costs. Firm-level value chains focus specifically on business units rather than entire divisions or industries. A value chain breaks down business unit activities into processes. Identifying the inputs, transformation and output of each department can help a company implement efficient processes that create a competitive advantage

A firm's value chain is linked to the value chains of its suppliers, distributors, and customers.

Information systems can be used to achieve strategic advantage at the industry level by working with other firms to develop industry-wide standards for exchanging information or business transactions electronically, which force all market participants to subscribe to similar standards. Such efforts increase efficiency, making product substitution less likely and perhaps raising entry costs.,

## **Primary Activities**

The five primary value chain activities provide direct value to the customer. Exact activities vary by company, but the primary groupings are inbound logistics, operations, outbound logistics, marketing and sales, and service. Inbound logistics represents the reception, storage and distribution of raw materials. Operations transforms the raw inputs into the finished goods for the customer. Outbound logistics delivers the final goods to customers. Marketing and sales represent activities that help customers buy the goods. Service includes the follow-up support, such as repair and maintenance services.

## **Support Activities**

In contrast to primary activities, support functions never directly interface with the customer. Instead, support functions enable effective performance of the primary activities. The main categories of support activities are firm infrastructure, human resources, technology and purchasing. Technology development can focus on process automation that allows the operations activities to run more efficiently. Human resources can support marketing by recruiting sales representatives that fit with the organization's culture.

## **Supply Chain**

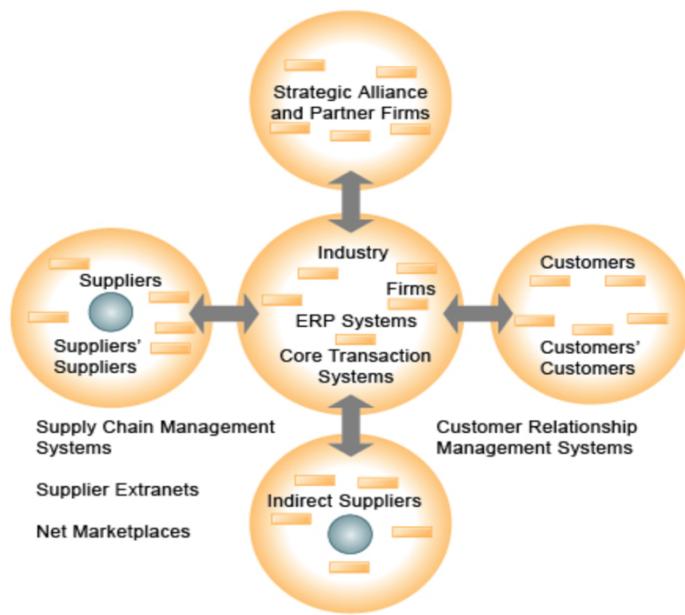
A company's value chain is part of a larger supply chain that includes interactions with suppliers and distributors. The supply chain includes the raw materials supplier, the manufacturer, the distributor, the retailer and the consumer. The supply chain helps analysts visualize what outside parties will be affected by decisions. For example, a company that implements a more efficient inventory management system will improve the efficiency of both the inbound logistics and purchasing departments, which have relationships with suppliers and manufacturers.

## **Value Chain Analysis**

To analyze a company's value and supply chains, it's helpful to map out a flow chart of all company processes. A graphical representation helps analysts identify key relationships and causation. Analysts should pay special attention to activities that affect each other on a cost basis. This information is useful for performing incremental analysis on "make or buy" decisions regarding outsourcing.

## Firm Value Web

Internet technology has made it possible to create highly synchronized industry value chains called value webs. A **value web** is a collection of independent firms that use information technology to coordinate their value chains to produce a product or service for a market collectively. It is more customer-driven and operates in a less linear fashion than the traditional value chain.



The value web is a networked system that can synchronize the value chains of business partners within an industry to respond rapidly to changes in supply and demand.

A large corporation is typically a collection of businesses. Information systems can improve the overall performance of these business units by promoting synergies and core competencies.

- In synergies, the output of some units can be used as inputs to other units, or two organizations pool markets and expertise, and these relationships lower costs and generate profits.
- A **core competency** is an activity for which a firm is a world-class leader, such as being the world's best miniature parts designer. A core competency relies on knowledge that is gained through experience as well as incorporating new, external knowledge. Any information system that encourages the sharing of knowledge across business units enhances competency.

Business models based on a network may help firms strategically by taking advantage of **network economics**. In network economics, the marginal costs of adding another participant or creating another product are negligible, whereas the marginal gain is much larger. For example, the more people offering products on eBay, the more valuable the eBay site is to everyone because more products are listed, and more competition among suppliers lowers prices.

Another network-based strategy is the **virtual company**, or virtual organization, which uses networks to link people, assets, and ideas, enabling it to ally with other companies to create and distribute products and services without being limited by traditional organizational boundaries or physical locations. One company can use the capabilities of another company without being physically tied to that company.

The traditional Porter model of competitive forces assumes a relatively static industry environment; relatively clear-cut industry boundaries; and a relatively stable set of suppliers, substitutes, and customers. With the emergence of the digital firm and the Internet, some modifications to the original competitive forces model are needed. Some of today's firms are much more aware that they participate in business ecosystems, loosely coupled but interdependent networks of suppliers, distributors, outsourcing firms, transportation service firms, and technology manufacturers. In a **business ecosystem**, cooperation takes place across many industries rather than many firms.

## **Case Studies of Local and Global Ecommerce System?**

### **Dashain Assignment**

**This is additional reference for students who wants to know more about case studies.**

#### **Writing a Case Study Analysis**

A case study analysis requires you to investigate a business problem, examine the alternative solutions, and propose the most effective solution using supporting evidence.

#### **Preparing the Case**

Before you begin writing, follow these guidelines to help you prepare and understand the case study:

- Read and Examine the Case Thoroughly.
  - Take notes, highlight relevant facts, underline key problems.
- Focus Your Analysis
  - Identify two to five key problems.
  - Why do they exist?
  - How do they impact the organization?
  - Who is responsible for them?
- Uncover Possible Solutions/Changes Needed
  - Review course reading, discussions, outside research, your experience.
- Select the Best Solution
  - Consider strong supporting evidence, pros, cons. Is this solution realistic?

#### **Drafting the Case**

Once you have gathered the necessary information, a draft of your analysis should include these general sections, but these may differ depending on your assignment directions or your specific case study:

- Introduction
  - Identify the key problems and issues in the case study.
  - Formulate and include a statement, summarizing the outcome of your analysis in 1-2 sentences.
- Background
  - Set the scene: background information, relevant facts, and the most important issues.
  - Demonstrate that you have researched the problems in this case study.
- Evaluation of the Case
  - Outline the various pieces of the case study that you are focusing on.
  - Evaluate these pieces by discussing what is working and what is not working.

- State why these parts of the case study are or are not working at all.
- Proposed Solution/Changes
  - Provide specific and realistic solutions or changes needed.
  - Explain why this solution was chosen.
  - Support this solution with the solid evidences, such as:
    - Concept from class (text readings, discussion, lectures)
    - Outside research
    - Personal experience
- Recommendations
  - Determine and discuss specific strategies for accomplishing the proposed solutions.
  - If applicable, recommend further action to resolve some of the issues.
  - What should be done and who should do it?

### **Finalizing the Case**

After you have composed the first draft of your case study analysis, read through it to check for any gaps or inconsistencies in content or structure:

- Is your statement clear and direct?
- Have you provided solid evidence?
- Is any component from the analysis missing?

When you make necessary revision, proof read and edit your analysis before submitting the final draft.

## **UNIT 3; ELECTRONIC PAYMENT SYSTEM**

### **Electronic Payment Systems**

#### **Introduction to Electronic Payment System (Requirements and Risks)**

Electronic payment systems are becoming central to on-line business process innovation as companies look for ways to serve customers faster and at lower cost. Emerging innovations in the payment for goods and services in electronic commerce promise to offer a wide range of new business opportunities.

Electronic payment systems and e-commerce are intricately linked given that on-line consumers must pay for products and services. Clearly, payment is an integral part of the mercantile process and prompt payment (or account settlement) is crucial. If the claims and debits of the various participants—individuals, companies, banks, and nonbanks—are not balanced because of payment delay or, even worse default, then the entire business chain is disrupted. Hence an important aspect of e-commerce is prompt and secure payment, clearing, and settlement of credit or debit claims.

But on-line sellers face a problem: How will buyers pay for goods and services? What currency will serve as the medium of exchange in this new marketplace? Everyone agrees that the payment and settlement process is a potential bottleneck in the fast-moving electronic commerce environment if we rely on conventional payment methods such as cash, checks, bank drafts, or bills of exchange. Electronic replicas of these conventional instruments are not well suited for the speed required in e-commerce purchase processing. For instance, payments of small denominations (micropayments) must be made and accepted by vendors in real time for snippets(pieces) of information. Conventional instruments are too slow for micropayments and the high transaction costs involved in processing them add greatly to the overhead. Therefore, new methods of payment are needed to meet the emerging demands of e-commerce. These new payment

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instruments must be secure, have a low processing cost, and be accepted widely as global currency tender.

We will examine these demands by looking at the following issues:

- What form and characteristics of payment instruments—for example, electronic cash, electronic checks, credit/debit cards—will consumers use?
- In on-line markets, how can we manage the financial risk associated with various payment instruments—privacy, fraud, mistakes, as well as other risks like bank failures? What security features (authentication, privacy, anonymity) need to be designed to reduce these risks?

To answer these questions, we will draw on examples of various electronic payment systems that have been proposed, prototyped, or actually deployed (implemented).

**Types of Electronic Payment Systems:** Electronic payment systems grow rapidly in banking, retail, health care, on-line markets, and even government—in fact, anywhere money needs to change hands. Organizations are motivated by the need to deliver products and services more cost effectively and to provide a higher quality of service to customers. Let's briefly describe the pertinent developments in various industries to provide an overall picture of electronic payment systems of the present.

Research into electronic payment systems for consumers can be traced back to the 1940s, and the first applications—credit cards—appeared soon after. In the early 1970s, the emerging electronic payment technology was labeled electronic funds transfer (EFT). EFT is defined as "any transfer of funds initiated through an electronic terminal, telephonic instrument, or computer or magnetic tape. EFT utilizes computer and telecommunication components both to supply and to transfer money or financial assets.

Work on EFT can be segmented into three broad categories:

### **1. Banking and financial payments**

- Large-scale or wholesale payments (e.g., bank-to-bank transfer)
- Small-scale or retail payments (e.g., automated teller machines and cash dispensers)

- Home banking (e.g., bill payment)

## **2. Retailing payments**

- Credit cards (e.g., VISA or MasterCard)
- Private label credit/debit cards (e.g., J.C. Penney Card)

## **3. On-line electronic commerce payments**

- Token-based payment systems

*Electronic cash (e.g., DigiCash)*

*Electronic checks (e.g.; NetCheque)*

*Smart cards or debit cards (e.g., Mondex Electronic Currency Card)*

- Credit card-based payment systems

Encrypted credit cards (e.g., World Wide Web form-based encryption) Third-party authorization numbers (e.g., First Virtual)

Retail payments and large-scale payments between banks and business are widely recognized as the pioneering efforts in electronic commerce that involve the extensive use of EDI for transferring payment information.

**Risks Associated with Electronic Payment System:** Electronic payment is a popular method of making payments globally. It involves sending money from bank to bank instantly -- regardless of the distance involved. Such payment systems use Internet technology, where information is relayed through networked computers from one bank to another. Electronic payment systems are popular because of their convenience. However, they also may pose serious risks to consumers and financial institutions.

## **Tax Evasion**

Businesses are required by law to provide records of their financial transactions to the government so that their tax compliance can be verified. Electronic payment however can frustrate the efforts of tax collection. Unless a business discloses the various electronic payments, it has made or received over the tax period, the government may not know the truth, which could cause tax evasion.

## **Fraud**

Electronic payment systems are prone to fraud. The payment is done usually after keying in a password and sometimes answering security questions. There is no way of verifying the true identity of the maker of the transaction. As long as the password and security questions are correct, the system assumes you are the right person. If this information falls into the possession of fraudsters, then they can defraud you of your money.

## **Impulse Buying**

Electronic payment systems encourage impulse buying, especially online. You are likely to make a decision to purchase an item you find on sale online, even though you had not planned to buy it, just because it will cost you just a click to buy it through your credit card. Impulse buying leads to disorganized budgets and is one of the disadvantages of electronic payment systems.

## **Payment Conflict**

Payment conflicts often arise because the payments are not done manually but by an automated system that can cause errors. This is especially common when payment is done on a regular basis to many recipients. If you do not check your pay slip at the end of every pay period, for instance, then you might end up with a conflict due to these technical glitches, or anomalies.

## **Online Credit Card Transaction**

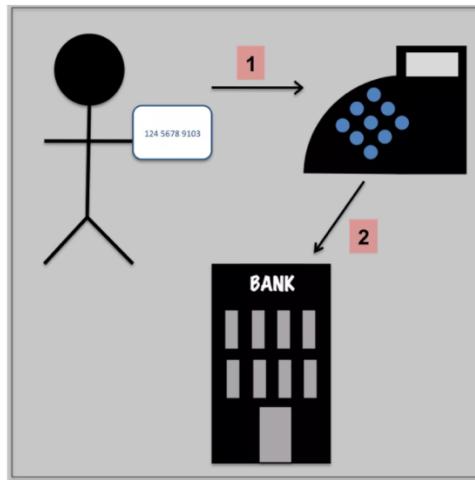
A lot of things happen between the time you swipe your credit card and sign the credit card slip. Everything that happens behind the scenes makes it possible for you to make purchases with

your credit card instead of having to go to the bank every time you want to spend money from your credit limit.

A few people/entities are involved in each credit card transaction:

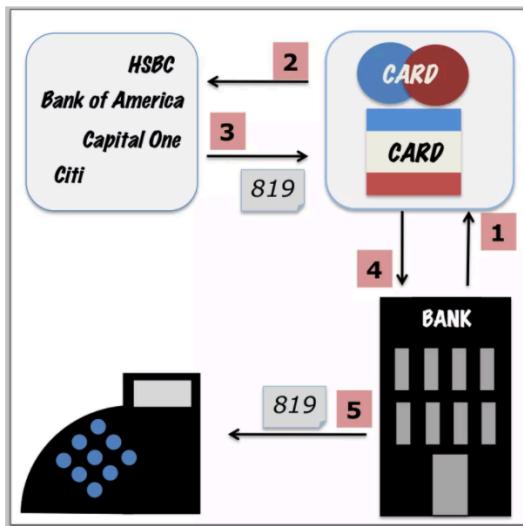
- The customer(you) who presents the credit card for payment.
- The merchant sells you goods or services.
- The merchants bank sends credit card transaction for approval.
- The credit card payment network is a liaison between the merchant bank and the credit card issuer.
- The credit card issuer approves and pays transaction.

### Swipe Your Credit Card for Approval



You present your card for payment by swiping your credit card through the payment terminal. The payment terminal communicates with the merchant bank to ask whether you can make the credit card purchase.

## Credit Card Authorization



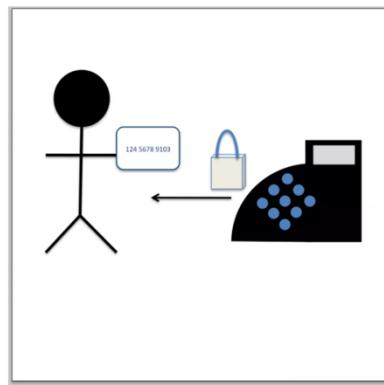
The merchant bank contacts the appropriate credit card network (Visa, MasterCard, American Express, or Discover) to get authorization for the credit card purchase. Then, the payment network contacts the credit card issuer to make sure the credit card is valid and there's enough available credit for the transaction.

American Express and Discover are the payment network and the credit card issuer, so they approve credit card transactions themselves. Visa and MasterCard, however, do not issue credit cards and must contact the credit card issuer.

The credit card issuer sends back an authorization code for the transaction. If your credit card is declined, you won't get a reason at the point of sale, just a message that the card was declined. You'll have to contact your card issuer directly to find out why your card was declined.

The store's bank sends their communications electronically either through the phone line or through the internet. You may have been to a store or restaurant and heard the screeching and static from the credit card terminal communicating with the merchant bank. Now you know what's going on.

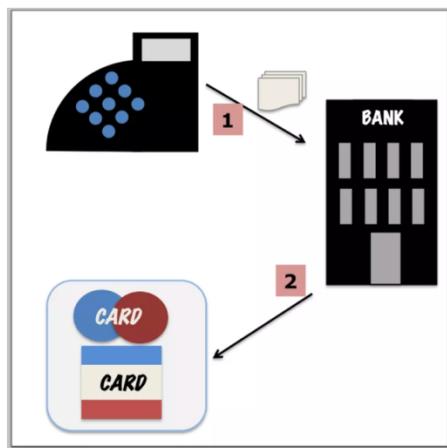
## Credit Card Approval



The merchant bank sends the approval message for your credit card purchase, the receipt prints, you sign, and you can leave with your purchase.

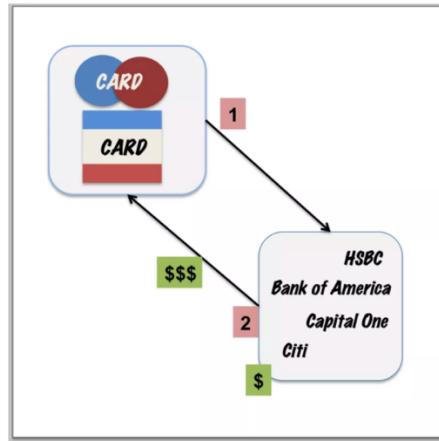
When you sign the receipt and leave the store with your purchase, your credit card has only been authorized for the payment. The merchant hasn't actually been paid and your credit card hasn't been charged. If you check your credit card online right after you've made a purchase, the payment probably hasn't shown up in your transaction list just yet. Some credit card issuers have more sophisticated reporting systems that will show *authorized* transactions and may even reduce your available credit by the amount of your recent purchase. It's more likely that you won't see the charge for a few days.

## Batch Processing



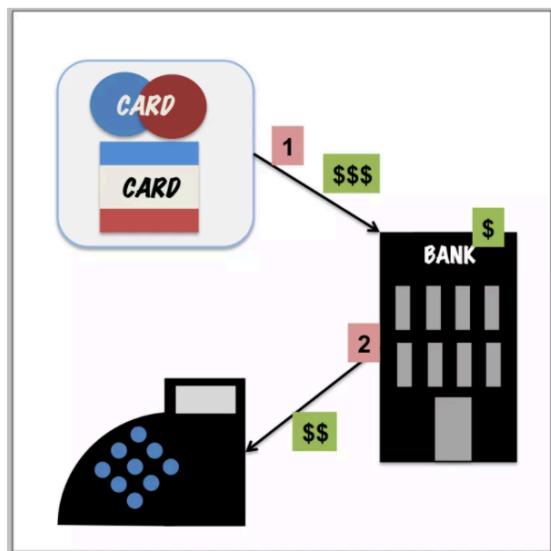
At the end of the day, the merchant prints a list of all the credit card transactions that have been made that day and sends them to their bank. The merchant's bank then sends the transactions to the appropriate payment network for processing.

## The Credit Card Issuer Sends Payment



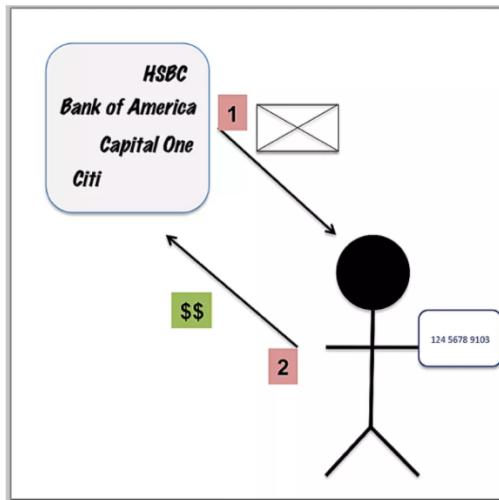
The credit card network lets each credit card issuer know what payments are due. The credit card issuer keeps a fee, the interchange fee, as part of its agreement with the merchant. Credit card issuers share the interchange fee with credit card networks. Since American Express and Discover are both the credit card network and the credit card issuer, they get to keep a higher percentage of the fee.

## The Merchant Gets Paid



The credit card network sends payment to the merchant bank who collects its own fee before depositing the credit card charges in the merchant's account.

## The Credit Card Issuer Bills You



Each month, the credit card issuer sends a bill for the charges you made during the month. Then, you pay some or all the charges. If you choose to pay only a portion of the charges, you'll pay interest on the amount that you don't pay. The credit card issuer uses the money and interest you pay to pay merchants as new transactions are made.

## Online Stored Value Payment System:

When we think of money, stored **value** means anything that isn't cash, but you can still use to transfer **value** – checks, **debit** cards, gift cards, and forms like that. These are used to transport some dollar amount which we can later exchange for goods and services.

A **stored value card**, or **gift card**, is a type of electronic bank debit **card**. **Stored value cards** have a specific dollar **value** pre-loaded to them. ... **Cards** issued by **card** networks (such as a Visa **gift card**) can be used anywhere that accepts general use **credit cards**.

## **Definition**

Stored value systems are a form of electronic payment technology. They coexist with credit and debit technology and principally target the low value transactions. Online stored value systems have very low transaction cost. Stored value systems are based on creating a form of electronic value, for example on smart cards or as computer files. The value can be bought (withdrawn) anytime and spent in optional parts at a later date.

## **History**

In the first half of the 1990s online stored value systems were developed. In the beginning the usage of stored value systems was low and it was unclear whether and when they will play a relevant role in the payments system market.

Today “**Stored Value Cards (SVC)**” are one of the most dynamic and fastest growing products in the financial industry”.

## **How Stored Value Cards work**

It is necessary to differ between two types of Stored Value Cards:

### **Closed system prepaid cards**

Closed system prepaid cards have substituted the traditional gift certificate and are known as merchant gift cards. “Closed system” means that the cards are only accepted at a single merchant. These cards are also referred to as “closed loop” or “single-purpose” cards. Purchasers buy a card for a fixed amount and can only use the card at the merchant that issues the card. The cards have often an expiration date or a service fee. In addition, most closed system cards cannot be repaid in cash.

### **Open system prepaid cards**

Open system prepaid cards have nothing in common with credit cards. The issuer doesn't allow a credit to the cardholder. Stored Value Cards use magnetic stripe technology to store information about funds that have been prepaid to the card. The value is not physically stored on the card. With the aid of the card number it is possible to identify the record in a central database. These cards are similar to closed system prepaid cards but they are connected with a retail electronic payments network such as Visa, Visa Electron, MasterCard or Maestro. Different to gift cards they can be used anywhere where debit cards with the same logo are accepted. They are very similar to debit cards except that they don't require a bank account and can be used to make debit transactions or to withdraw cash from ATM's.

Furthermore, the cards can be used as a safe and responsible method for parents to give their children some spending power. Kalixa or Travelex are examples of such “open loop” or “multipurpose” cards.

Another example of open system prepaid cards is the payroll card. Payroll cards enable employers to pay their unbanked employees via direct deposit.

## **Digital and Mobile Wallet**

### Digital Wallets

Digital wallet are technologies that electronically stores credit card numbers, debit card numbers, loyalty card numbers, etc. on the cloud. Your money still stays in your bank or credit card account. Digital wallet basically keeps your details to make transactions easier. Examples of digital wallet are Google Pay, Master pass & Visa Checkout. With digital wallets, we can not only go cashless, we can also go cardless.

A **digital wallet** also known as "e-Wallet" refers to an electronic device, online service, or software program that allows one party to make electronic transactions with another party bartering digital currency units for goods and services. This can include purchasing items on-line with a computer or using a smartphone to purchase something at a store. Money can be deposited in the digital wallet prior to any transactions or, in other cases, an individual's bank account can be linked to the digital wallet. Users might also have their driver's license, health card, loyalty card(s) and other ID documents stored within the wallet. The credentials can be passed to a merchant's terminal wirelessly via near field communication (NFC). Increasingly, digital wallets are being made not just for basic financial transactions but to also authenticate the holder's credentials. For example, a digital wallet could verify the age of the buyer to the store while purchasing alcohol.

## E-Wallets

E-Wallets are prepaid wallets that require money to be loaded prior to any transaction. It can either be accessed on the e-wallet's website or applications via laptop, tablet, or phone. Some of e-wallet functions include:

- Storing credit and debit card information
- Storing funds (e-money)
- Keeping coupons or loyalty credits
- Enabling payment for purchases at physical or online store,
- Splitting bills
- Peer-to-peer transfer,
- And of course, security.

## Mobile Wallets

A mobile wallet can be installed on your phone as an application and allows you to “tap to pay” in stores, often using Near Field Communication (NFC) technology. With a mobile wallet, a user typically pays by tapping a terminal or scanning a QR code with a smartphone or devices such as a smartwatch or a fitness tracker.

A mobile wallet is a type of payment service through which businesses and individuals can receive and send money via mobile devices. It is a form of e-commerce model that is designed to be used with mobile devices due to their convenience and easy access.

A mobile wallet is also known as mobile money or a mobile money transfer.

## More than one thing

Each of the above terms shows specific functionality of a wallet. However, they are not bound to be only one thing. Mobile wallets can be a digital wallet and/or e-wallets but not always. For example, PayPal are both digital and e-wallets but is not mobile as the PayPal mobile app does not have the NFC technology to pay in brick-and-mortar stores.

On the other hand, GrabPay, Boost, GCash, Alipay, LINE Pay, and Touch ‘n Go are all both e-Wallet and Mobile Wallet, but are not a digital wallet as they do not keep card information for direct payments from the bank account. If you have a physical store, these wallets should be considered as they allow customers to make payment at your store.

## Openness of Digital, Mobile & e-Wallets

While the classification between Digital Wallet, e-Wallet & Mobile Wallets can be interconnected, the classification based on their “openness” is very distinct. They can only be either closed, semi-closed, or open wallet.

### **Closed Wallet**

A closed wallet is made to be used exclusively for the purchases in that company. You cannot withdraw the money you’ve topped up, but the value will not expire. Usually closed wallets give loyalty rewards and discounts coupons that can be claimed and used through their platform.

Example: Starbucks

### **Semi-closed wallet**

A semi-closed wallet enables the purchase of goods and services from their registered merchants. Some wallet lets you withdraw money out, even though if left in there the value will not expire. Semi-closed wallets also give loyalty rewards and coupons for purchases made using their payment system. Registered merchants are welcome to make a promotional offer for wallet users.

Example: Boost, GrabPay, AliPay, Touch ‘n Go, GCash, LINE pay

### **Open Wallet**

Open wallet enable purchase from any merchants that accepts cards. With open wallets you can withdraw from ATMs. As any other type, the fund in your wallet should not expire. The difference

between open wallet and the bank is the ability to provide savings account, issuing credit cards and other banking services.

Example: Visa Checkout, GooglePay, Masterpass

Okay, so let's recap the online wallet differences:

Digital Wallet	eWallet	Mobile Wallet
Store credit/debit card information.	Stores credit value in the wallet.	Need to download mobile application.
Payment deducted directly from bank/credit account.	Requires reload to deduct amount from wallet account.	Payment can be made at physical stores by tapping or scanning.

And they can either be:

Closed Wallet	Semi-closed Wallet	Open Wallet
Exclusively for purchases at a specific company only.	For purchases at registered merchant stores.	Open to any merchant with credit card terminal.

## **Digital Token based Electronic Payment Systems**

None of the banking or retailing payment methods is completely adequate in their present form for the consumer-oriented e-commerce environment. Their deficiency is their assumption that the parties will at some time be in each other's physical presence or that there

will be a sufficient delay in the payment process for frauds, overdrafts, and other undesirables to be identified and corrected. These assumptions may not hold for e-commerce and so many of these payment mechanisms are being modified and adapted for the conduct of business over networks.

Entirely new forms of financial instruments are also being developed. One such new financial instrument is "**electronic tokens**" in the form of electronic cash/money or checks. Electronic tokens are designed as electronic analogs of various forms of payment backed by a bank or financial institution. Simply stated, electronic tokens are equivalent to cash that is backed by a bank.

Electronic tokens are of three types:

- 1. Cash or real-time:** Transactions are settled with the exchange of electronic currency. An example of on-line currency exchange is *electronic cash (e-cash)*.
- 2. Debit or prepaid:** Users pay in advance for the privilege of getting information. Examples of prepaid payment mechanisms are stored in smart cards and electronic purses that store electronic money.
- 3. Credit or postpaid:** The server authenticates the customers and verifies with the bank that funds are adequate before purchase. Examples of postpaid mechanisms are *credit/debit cards* and *electronic checks*.

## **Electronic Cash (e-cash)**

Electronic cash (e-cash) is a new concept in on-line payment systems because it combines computerized convenience with security and privacy that improve on paper cash. Its versatility opens up a host of new markets and applications. E-cash presents some interesting

characteristics that should make it an attractive alternative for payment over the Internet.

E-cash focuses on replacing cash as the principal payment vehicle in consumer-oriented electronic payments. Although it may be surprising to some, cash is still the most prevalent consumer payment instrument even after thirty years of continuous developments in electronic payment systems. Cash remains the dominant form of payment for three reasons: (1) lack of trust in the banking system, (2) inefficient clearing and settlement of noncash transactions, and (3) negative real interest rates paid on bank deposits.

Now compare cash to credit and debit cards. First, they can't be given away because, technically, they are identification cards owned by the issuer and restricted to one user. Credit and debit cards are not legal tender, given that merchants have the right to refuse to accept them. Nor are credit and debit cards bearer instruments; their usage requires an account relationship and authorization system. Similarly, checks require either personal knowledge of the payer or a check guarantee system. Hence, to really create a novel electronic payment method, we need to do more than recreate the convenience that is offered by credit and debit cards. We need to develop e-cash that has some of the properties of cash.

**What is electronic cash?** : Electronic cash is one of the instruments that can be used to conduct paperless transactions. Paperless transaction is a term used to describe financial exchanges that do not involve the physical exchange of currency. Instead, monetary value is electronically credited and debited. Often called e-cash or digital money, this financial instrument is commonly used to conduct distant transactions, such as those between parties on the Internet and those between parties in different countries.

In most cases, e-cash is equivalent to paper currency and can therefore be exchanged among individuals or spent for any types of goods or services that a person wishes to acquire. This financial instrument has played a large role in the increasing popularity of telecommuting, which is an arrangement that allows people to work together in distant places.

Digital currency can allow a freelancer in Nepal to be paid for work that he did for a contractor in Canada. This is possible due to a monetary exchange system. The value of that money is then credited to someone else in another place. The paper currency the sender presents or which is taken from his account is not physically sent and given to the receiver. Electronic cash is exchanged in a similar way. One major difference, however, is that transactions can often be conducted without a live middle man.

People involved in electronic cash transfers may never acquire any paper currency. They may receive their funds electronically and they may use them electronically. This does not mean, however, that it is impossible to get paper currency from electronic cash.

In many instances, electronic money can be converted into paper currency quite easily. This is possible because e-cash is commonly held in an account that can be accessed in several ways. For example, many have debit cards that can be used at an automated teller machine (ATM). Sometimes, a person can request that all or a portion of the money held electronically be made available by check.

There are a number of advantages of electronic cash. One of them is that it eliminates the apprehension that many people feel about carrying and exchanging paper currency. Another advantage of electronic cash is that it is usually easily converted to another currency, making traveling and international business substantially easier.

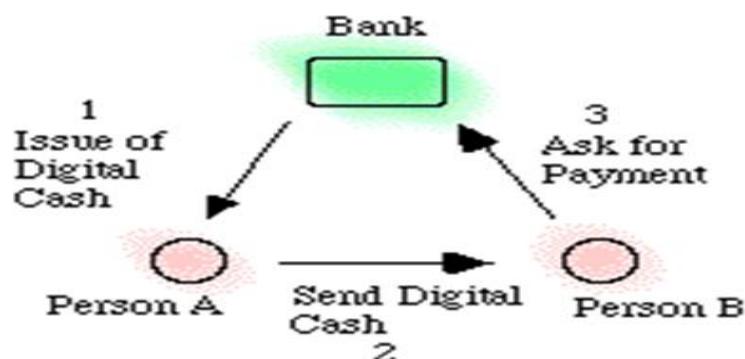


Fig: Transaction of Electronic Cash.

The figure shows the basic operation. User A obtains digital cash "coins" from her bank (and the bank deducts a corresponding amount from her account). The user is now entitled to use the coins by giving them to another user B, which might be a merchant. B receives e-cash during a transaction and see that it has been authorized by a bank. They can then pay the cash into their account at the bank.

Ideal properties of a Digital Cash system should be:

1. **Secure.** Alice should be able to pass digital cash to Bob without either of them, or others, able to alter or reproduce the electronic token.
2. **Anonymous.** Alice should be able to pay Bob without revealing her identity, and without Bob revealing his identity. Moreover, the Bank should not know who Alice paid or who Bob was paid by. Even stronger, they should have the option to remain anonymous concerning the mere existence of a payment on their behalf.
3. **Portable.** The security and use of the digital cash is not dependent on any physical location. The cash should be able to be stored on disk or USB memory stick, sent by email, SMS, internet chat, or uploaded on web forms. Digital cash should not be restricted to a single, proprietary computer network.
4. **Off-line capable.** The protocol between the two exchanging parties is executed off-line, meaning that neither is required to be host-connected in order to proceed.
5. **Wide acceptability.** The digital cash is well-known and accepted in a large commercial zone. With several digital cash providers displaying wide acceptability, Alice should be able to use her preferred unit in more than just a restricted local setting.
6. **User-friendly.** The digital cash should be simple to use from both the spending perspective and the receiving perspective. Simplicity leads to mass use and mass use leads to wide acceptability. Alice and Bob should not require a degree in cryptography as the protocol machinations should be transparent to the immediate user.

Here is the summary of the pros and cons of the online electronic cash system:

## **Pros**

- Provides fully anonymous and untraceable digital cash:
- No double spending problems (coins are checked in real time during the transaction).
- No additional secure hardware required

## **Cons**

- Communications overhead between merchant and the bank.
- Huge database of coin records -- the bank server needs to maintain an ever-growing database for all the used coins' serial numbers.
- Difficult to scale, need synchronization between bank servers.
- Coins are not reusable

## **Electronic Checks:**

When you write a check, you may assume that the piece of paper you write on will be deposited at a bank and processed manually. Electronic check conversion makes that process less and less likely. Instead of processing the piece of paper, some businesses prefer to turn your paper check into an electronic check.

How Electronic Checks Work? How does a piece of paper become an electronic check? The business you write the check to slips the check into a machine that reads information from your check. That information is all the business needs to collect money from your bank account.

With E-Checks, a check imager is connected to a small printer through a credit card terminal directly at the point of sale. When a customer presents a check, the check is scanned by the imager, the magnetic data (MICR) indicating the bank routing number and account number are read, and the dollar amount of the check is entered. The E-Check process verifies the check by comparing the check's bank account and the customer's driver's license with a national negative database to determine if the account has a fraud history, is closed, or has

had insufficient funds (NSF) problems. If the check is approved, a receipt is printed for customer signature. The check and a copy of the signed receipt are returned to the customer. The captured data is used in the electronic transfer of money through the Automated Clearing House (ACH) system.

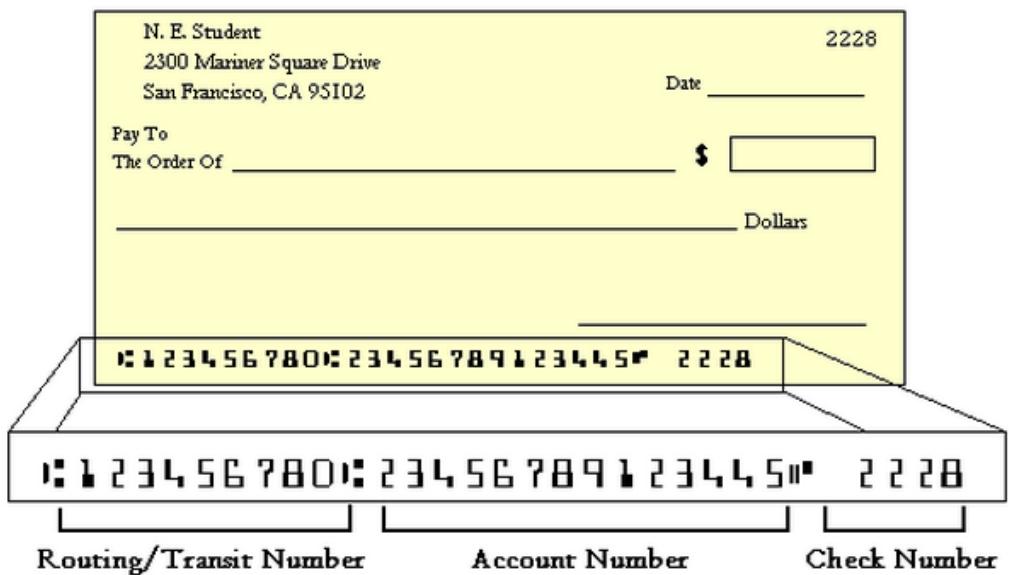


Fig: Electronic Check Format.

Merchant benefits of converting checks to an electronic form:

- Saves you time with your deposits - no more bank runs or long teller lines.
- Lowers traditional bank fees, like per item deposit and returned item fees.
- Funds you quickly, usually within 2 business days of the original transaction.
- Secures your customer's personal and bank account information by returning the original item to the check writer.
- Provides your customers complete transaction information for easy bank reconciliation, as well as providing sales information, like store name and location.
- Expandable equipment is simple and user friendly.

**Impact of Electronic Checks:** Electronic checks allow businesses to process payments more quickly. As a result, the money will come out of your checking account sooner than you might expect. You need to make sure you have enough money in your account when you write a check, and you can't rely on 'float' time as much as you might have in the past. Keep a balanced checkbook and consider some type of overdraft protection plan.

Since you're paying electronically anyway, you now have even less reason to write checks the old fashioned way.

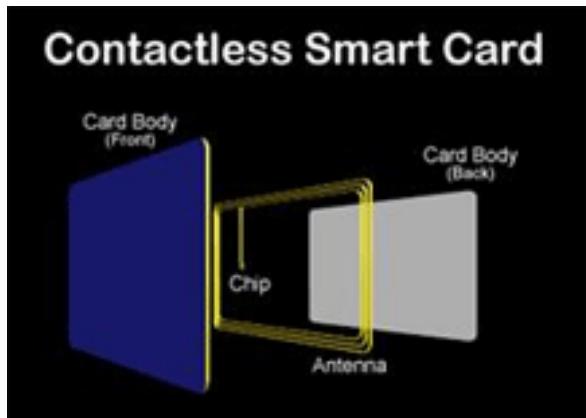
**Where Electronic Check Conversion Happens?** Your paper checks may be converted to electronic checks right in front of you, or it may happen when you mail a check to somebody to pay a bill. Either way, they're making an electronic check so that they can process your payment electronically.

**Electronic Check Disclosure and Identification:** Businesses are supposed to notify you that they're making an electronic check. If you're in a store, there should be a sign near the register that says they'll turn your paper check into an electronic check. If you're mailing in a check to pay a bill, the company probably disclosed their electronic check policy somewhere in the fine print of an agreement or on the back of your statement. If the cashier drops your check into a machine and hands it back to you when you make a purchase, they've used an electronic check.

### Smart Cards

A smart card is a device that includes an embedded integrated circuit chip (ICC) that can be either a secure microcontroller or equivalent intelligence with internal memory or a memory chip alone. The card connects to a reader with direct physical contact or with a remote contactless radio frequency interface. With an embedded microcontroller, smart cards have the unique ability to store large amounts of data, carry out their own on-card functions (e.g., encryption and mutual authentication) and interact intelligently with a smart card reader. Smart card technology is available in a variety of form factors, including plastic cards, fobs, subscriber identity modules (SIMs) used in GSM mobile phones and etc.

**Smart Card Technology:** There are two general categories of smart cards: **contact** and **contactless** as shown in figure below.



A contact smart card must be inserted into a smart card reader with a direct connection to a conductive contact plate on the surface of the card (typically gold plated). Transmission of commands, data, and card status takes place over these physical contact points.

A contactless card requires only close proximity to a reader. Both the reader and the card have antennae, and the two communicate using radio frequencies (RF) over this contactless link. Most contactless cards also derive power for the internal chip from this electromagnetic signal. The range is typically one-half to three inches for non-battery-powered cards, ideal for applications such as building entry and payment that require a very fast card interface.

Two additional categories of cards are **dual-interface cards** and **hybrid cards**. A hybrid card has two chips, one with a contact interface and one with a contactless interface. The two chips are not interconnected. A dual-interface card has a single chip with both contact and contactless interfaces. With dual-interface cards, it is possible to access the same chip using either a contact or contactless interface with a very high level of security.

The chips used in all of these cards fall into two categories as well: microcontroller chips and memory chips. A memory chip is like a small floppy disk with optional security. Memory chips are less expensive than microcontrollers but with a corresponding decrease in data management security. Cards that use memory chips depend on the security of the card reader for processing and are ideal for situations that require low or medium security.

A microcontroller chip can add, delete, and otherwise manipulate information in its memory. A microcontroller is like a miniature computer, with an input/output port, operating system, and hard disk. Smart cards with an embedded microcontroller have the unique ability to store large amounts of data, carry out their own on-card functions (e.g., encryption and digital signatures) and interact intelligently with a smart card reader.

The selection of a particular card technology is driven by a variety of issues, including:

- Application dynamics

- Prevailing market infrastructure
- Economics of the business model
- Strategy for shared application cards

Smart cards are used in many applications worldwide, including:

- **Secure identity applications** - employee ID badges, citizen ID documents, electronic passports, driver's licenses, online authentication devices
- **Healthcare applications** - citizen health ID cards, physician ID cards, portable medical records cards
- **Payment applications** - contact and contactless **credit/debit cards**, transit payment cards
- **Telecommunications applications** - GSM Subscriber Identity Modules, pay telephone payment cards

## **Debit and Credit Cards**

“A generation ago, it wasn’t all that unusual to be out for dinner with friends or at the register with a cart full of groceries and realize you didn’t have enough cash to cover the bill. But today, you’re likely to pull out a debit or credit card and not think anything of it.”

It’s hard now to imagine a time when those noncash options weren’t available — especially if you were born in the 1970s or later. Credit cards have been around since the 1950s, and debit cards were introduced in the mid-1970s. By 2006, there were 984 million bank-issued Visa and MasterCard credit and debit cards in the United States alone.

Though the two types of cards may be used interchangeably, there are notable differences between them. Let’s start with debit cards.

**Debit Cards:** Debit cards are linked to your bank account so the money you spend is automatically deducted from your account. They provide a convenient alternative to cash, especially if you do a lot of shopping online. Debit cards can also help you budget. Use your

card to pay your bills and day-to-day expenses and your monthly statement will provide a good snapshot of how much you spend per month and where it's going. There's another benefit as well: Unlike credit cards, your bank balance goes down with each debit card transaction, so you're less likely to overspend. (Many banks offer "overdraft protection" that allows you to exceed your balance. But you'll end up paying interest, and maybe extra fees, on the money you borrow from your overdraft account.)

With so many benefits to the debit card, why use a credit card at all? There are three main reasons: You can spend more than you have — or postpone paying, at least — and you typically get better rewards and better protection than you do with debit cards.

**Credit Cards:** Credit cards basically allow you to use someone else's money (the card issuer's) to make a purchase while you pay the money back later. If you do so within the billing period — generally, 15 to 45 days — you can avoid paying any interest on it. The problem arises, of course, when you don't pay the balance in full and are charged interest as well. That can quickly add up. If it takes you two years to pay off a \$500 balance, for example, and you're being charged 18 percent interest, you'll end up paying nearly \$100 more in interest.

If you use them responsibly though, credit cards can offer other advantages. They help build your credit, as long as you pay your bills on time. Some also offer rewards that you can use to get gifts, cash back or discounts for products, services and special events. They also provide more protection if someone steals your card or bank information. If you notice a fraudulent charge on your credit card account, you can call the card issuer, make a dispute claim, and the charge should be removed from your balance. But if thieves steal your debit card information and use it, it may take weeks for the bank to investigate your claim and replace the lost funds. In the meantime, you may have to deal with a dwindling bank balance or bounced checks.

Federal law also protects you if you need to dispute charges on a credit card, but not if you use a debit card or other forms of payment. If you paid cash or used a debit card, the retailer already has your money. So you have a lot less leverage, and there's no guarantee you'll get

that money back. But if you pay for something with your credit card and aren't happy with the purchase, your card issuer can legally withhold payment from the retailer until they resolve the dispute, and you won't be charged.

For most people, using both a debit card and credit card makes sense. The key is not to spend more than you have with either. If you can do that, you'll be able to enjoy the benefits that each provide.

**Working Techniques of Credit Cards:** Credit card payment processing for the e-commerce electronic payment system takes place in two phases: authorization (getting approval for the transaction that is stored with the order) and settlement (processing the sale which transfers the funds from the issuing bank to the merchant's account). The flow charts below represent the key steps in the process starting from what a customer sees when placing an order through completing the sale and finishing with the merchant processing the sale to collect funds.

#### Authorization

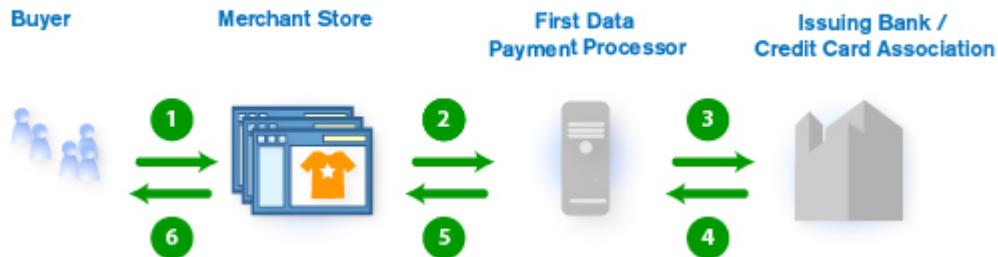


Fig: Authorization Process of Credit Cards.

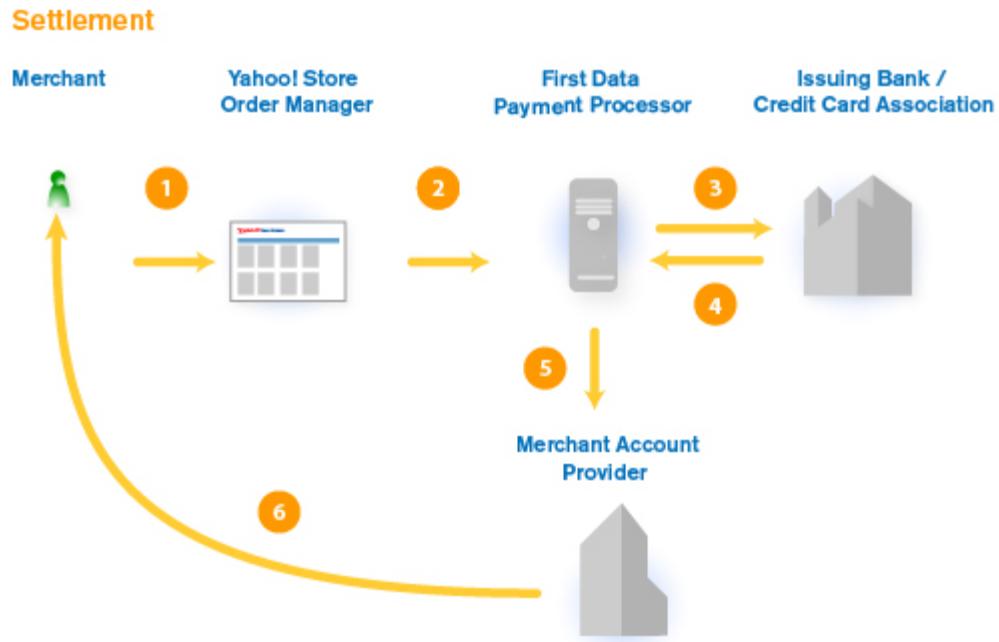


Fig: Settlement Process of Credit Cards.

**Benefits and Limitations of Credit Cards:** Advantages and Disadvantages of Credit Cards are:

#### Advantages

**Convenience**--Credit cards can save your time and trouble--no searching for an ATM or spend beyond your means. keeping cash on-hand.

**Record keeping**--Credit card statements can help you track your expenses. Some cards even provide year-end summaries that really help out at tax time.

**Low-cost loans**--You can use revolving credit to save today (e.g., at a one-day sale), when available cash is a week away.

**Instant cash**--Cash advances are quick and convenient, putting cash in your hand when you need it.

#### Disadvantages

**Overuse**--Revolving credit makes it easy to time and trouble--no searching for an ATM or spend beyond your means. keeping cash on-hand.

**Paperwork**--You'll need to save your receipts and check them against your statement each month. This is a good way to ensure that you haven't been overcharged.

**High-cost fees**--Your purchase will suddenly become much more expensive if you carry a balance or miss a payment.

**Unexpected fees**--Typically, you'll pay between 2 and 4 percent just to get the cash

**Build positive credit**--Controlled use of a credit card can help you establish credit for the first time or rebuild credit if you've had problems in the past--as long as you stay within your means and pay your bills on time.

**Purchase protection**--Most credit card companies will handle disputes for you. If a merchant won't take back a defective product, fraudulent charges. check with your credit card company.

advance; also cash advances usually carry high interest rates.

**Deepening your debt**--Consumers are using credit more than ever before. If you charge freely, you may quickly find yourself in over your head--as your balance increases, so do your monthly minimum payments.

**Homework**--It's up to you to make sure you receive proper credit for incorrect or

## **Electronic Billing Presentment and Payment (EBPP) System**

Electronic bill payment and presentment (EBPP) is a process that companies use to collect payments electronically through systems like the Internet, direct-dial access, and Automated Teller Machines (ATMs). It has become a core component of online banking at many financial institutions today. Other industries—including insurance providers, telecommunications companies, and utilities—depend on EBPP services as well.

### **Understanding EBPP**

EBPPs come in two types: biller-direct and bank-aggregator. Biller-direct is electronic billing, which is offered by the company providing the good or service. The company gives customers the option to pay bills directly on their web site and might alert them when a payment is due via email. The customer then logs into the site via a secure connection, reviews the billing information, and enters payment amount.

## Key Takeaways

- EBPPs are systems used to collect payments electronically.
- A biller-direct EBPP lets users pay bills directly via the company's website.
- In the bank-aggregator model, a banking customer can pay several different bills from their bank accounts.
- Some newer services allow customers to pay all of their bills from one website and these are called consumer-consolidation EBPPs.
- The bank-aggregator or bill-consolidator model allows customers to pay bills to many different companies through one portal. That is, the service collects different payments from customers and distributes each payment to the appropriate company. A bank, for instance, might offer online users the option to make many different payments like credit cards, utility bills, and insurance premiums. Standalone sites also exist that allow people to view and pay all of their bills. These are called consumer consolidator models.
- Some newer EBPP products include features like secure email delivery, stored payment data, and autopay. For example, a healthcare insurance company looking to streamline its customer billing system may decide to switch to EBPP and allow customers to pay directly on their website or to have premiums automatically deducted each month. Doing so saves customers the hassle of filing paperwork and can save the organization on document delivery and processing costs.

- Some providers allow the development of EBPP systems by building new payment sites for their customers. These might include features to authorize transactions, capture payments, or allow for refunds. These systems typically accept major credit cards and can sometimes save an enterprise money on transaction processing costs, increasing their revenue and profit overall.

## **EBPP and Online Banking**

Many large banks offer electronic bill payment and presentment services as a part of their online banking system. In general, online banking, which is sometimes called "Internet banking" or "web banking," allows users to execute financial transactions via the Internet. Specifically, an online bank offers customers the ability to make deposits, withdrawals, transfers between accounts, and other traditional services, as well as online bill payments, such as EBPP.

Convenience is obviously a major advantage of online banking because transactions can take place 24 hours-a-day, seven days a week. On the downside, accounts can be vulnerable to hacking (although banking security is continually improving). For that reason, when using online banking, consumers are advised to use their data plans, rather than public Wi-Fi networks, to help prevent unauthorized access.

### **What Is Secure Electronic Transaction (SET)?**

Secure electronic transaction (SET) was an early communications protocol used by e-commerce websites to secure electronic debit and credit card payments. Secure electronic transaction was used to facilitate the secure transmission of consumer card information via electronic portals on the Internet. Secure electronic transaction protocols were responsible for blocking out the personal details of card information, thus preventing merchants, hackers, and electronic thieves from accessing consumer information.

### **Understanding Secure Electronic Transaction (SET)**

Secure electronic transaction protocols were supported by most of the major providers of electronic transactions, such as Visa and MasterCard. These protocols allowed merchants to verify their customers' card information without actually seeing it, thus protecting the customer. The information on the cards was transferred directly to the credit card company for verification.

The process of secure electronic transactions used digital certificates that were assigned to provide electronic access to funds, whether it was a credit line or bank account. Every time a purchase was made electronically, an encrypted digital certificate was generated for participants in the transaction—the customer, merchant, and financial institution—along with matching digital keys that allowed them to confirm the certificates of the other party and verify the transaction. The algorithms used would ensure that only a party with the corresponding digital key would be able to confirm the transaction. As a result, a consumer's credit card or bank account information could be used to complete the transaction without revealing any of their personal details, such as their account numbers. Secure electronic transactions were meant to be a form of security against account theft, hacking, and other criminal actions.

### **Feature of SET**

#### **Confidentiality of Information**

Cardholder account and payment information are secured all the time, especially during the transaction. This is an important feature of SET whereby the encryption is using Data Encryption Standard (DES) to improve confidentiality.

#### **Integrity of Data**

With integrity of data, all the payment information between the cardholder and merchant will be secure all the time. With the help of digital signature like RSA, the data will be sure.

#### **Cardholder Account Authentication**

SET use X.509v3 digital signature with RSA during the authentication process. This allows the merchant to verify either the credit card is valid or invalid.

## **Merchant Authentication**

With X.509v3 digital signature, SET allows the card holder to verify either the merchant is valid or invalid. This feature can prevent from fraud or scam.

## **Participants in SET**

### **Merchant**

Person or organization that has goods to sell.

Sell goods and services. Especially web transaction.

Acquirer

### **Cardholder**

### **Consumer**

Can purchase goods and services from merchant with credit card.

### **Issuer**

Issuer

Financial institution

Bank

Provide credit card to consumer

Collect debt payment from consumer

### **Payment Gateway**

Operated by Acquirer or 3rd party

Work as middleman between SET and Issuer

Provide authorization and payment function during transaction

## **Issuer**

Certificate Authority  
Issuer of X.509v3

-Issue X.509v3 to merchant, cardholders, and payment gateway

## **E-Auction**

An e-auction is a transaction between sellers (the auctioneers) and bidders (suppliers in business to business scenarios) that takes place on an electronic marketplace. It can occur business to business, business to consumer, or consumer to consumer, and allows suppliers to bid online against each other for contracts against a published specification.

This kind of environment encourages competition, with the result that goods and services are offered at their current market value.

1. Types of eAuction
2. eAuction Process
3. Benefits for Buyers
4. Benefits for Suppliers
- 5.

### **Types of e-auction**

- **Classic reverse auction** – Multiple sellers compete to obtain the buyer's business. The buyer can see all the offers and may choose which they would prefer. Predominantly used for procurement.
- **English auction** – English auctions are where bids are announced by either an auctioneer or the bidders, and winners pay what they bid to receive the object. The most common and straightforward form of e-auction, they're intuitive, user-friendly and can help to reduce transaction costs.
- **Dutch auction** – Dutch auctions start at a high price, which is then incrementally lowered until a buyer accepts the price. The first person to bid wins the auction, which makes them good for quick decisions.

- **Japanese auction** – Here the buyer sets a high price which decrements at pre-set amounts at pre-set intervals e.g. £500 every 2 hours. If a supplier is happy to provide the goods and services at that price, the transaction then goes ahead.

# CHAPTER 4

## Electronic Commerce Software



# Learning Objectives

In this chapter, you will learn:

- How to find and evaluate Web-hosting services
- What functions are performed by electronic commerce software
- How electronic commerce software works with database and ERP software
- What enterprise application integration and Web services are and how they can be used with electronic commerce software

# Learning Objectives (cont'd.)

- Which types of electronic commerce software are used by small, medium, and large businesses
- How electronic commerce software works with customer relationships management, knowledge management, and supply chain management software

# Introduction

- Case study: Harry Barker
  - Sells pet products online
  - Prepared in advance for an expected increase in online orders from a *Good Morning America* segment
    - Added an additional Web server
    - Hired additional temporary staff
    - Created a customer Web page
  - Company followed up to measure how well it met new customer expectations

# Web Hosting Alternatives

- Self-hosting is running servers in-house
  - Most often used by large companies
- Third-party Web-hosting service providers offer Web services, electronic commerce functions
  - Often used by midsize, smaller companies
- Commerce service providers (CSPs) provide Internet access and Web-hosting services
  - Offer Web server management and rent application software
  - Also called Managed service providers (MSPs) or Application service providers (ASPs)

# Web Hosting Alternatives (cont'd.)

- Web-hosting service options
  - Shared hosting means client's Web site on a server hosting other Web sites simultaneously
  - Dedicated hosting means the client Web server not shared with other clients
    - Service provider owns and maintains server hardware, leases it to client, and provides Internet
- With co-location (collocation or colocation) service the provider rents physical space to client with a reliable power supply, Internet connection
  - Clients install/maintain server hardware and software

# Web Hosting Alternatives (cont'd.)

- Web server-hosting decisions
  - Hardware platform and software combination
    - Should be upgradable when site's Web traffic increases
  - Scalable hardware and software combinations
    - Adaptable to meet changing requirements

# Basic Functions of Electronic Commerce Software

- All electronic commerce solutions must provide
  - Catalog display, shopping cart capabilities and transaction processing
- Larger complex sites may include software with added features and capabilities

# Catalog Display Software

- Catalog organizes goods and services being sold
  - May organize by logical departments
    - Web store advantage is a single product may appear in multiple categories
- Catalog is a listing of goods and services
  - Static catalog is a simple list written in HTML
    - Must edit HTML to add or delete items
  - Dynamic catalog stores information in a database with photos, detailed descriptions and a search tool for locating item and determining availability
  - Both located in third tier of Web site architecture

# Shopping Cart Software

- Early electronic commerce used forms-based shopping
  - Shoppers selected items by filling out online forms which was awkward if ordering more than one or two items and error prone
- Electronic shopping carts are now standard
  - Keep track of items customer selected and allows them to view cart contents, add and remove items
  - Ordering requires a simple click which executes the purchase transaction
    - Screen asks for billing and shipping information

# Shopping Cart Software (cont'd.)

- Web is a stateless system that does not retain information from one transmission to another
  - Shopping cart software must store information
    - Cookies allows information to be stored and retrieved
    - If browser does not allow cookie storage software automatically assigns temporary number
- Dynamic pricing management software adjusts prices in real time based on variables seller chooses
- Promotion management software allows sellers to create special offers on specific products

# Shopping Cart Software (cont'd.)

- Fulfillment integration software connects seller's shopping cart to fulfillment provider's computer
  - Shipping automatically triggered at completed sale
- Product review management software allows customers to post reviews of products
- Product recommendation triggers are tools that respond to customer's product selection
  - Provides suggestions for related products, refills
- Abandoned cart management software enables shopping cart to be retained for later when customer session is terminated

# Gary's Tool Shed

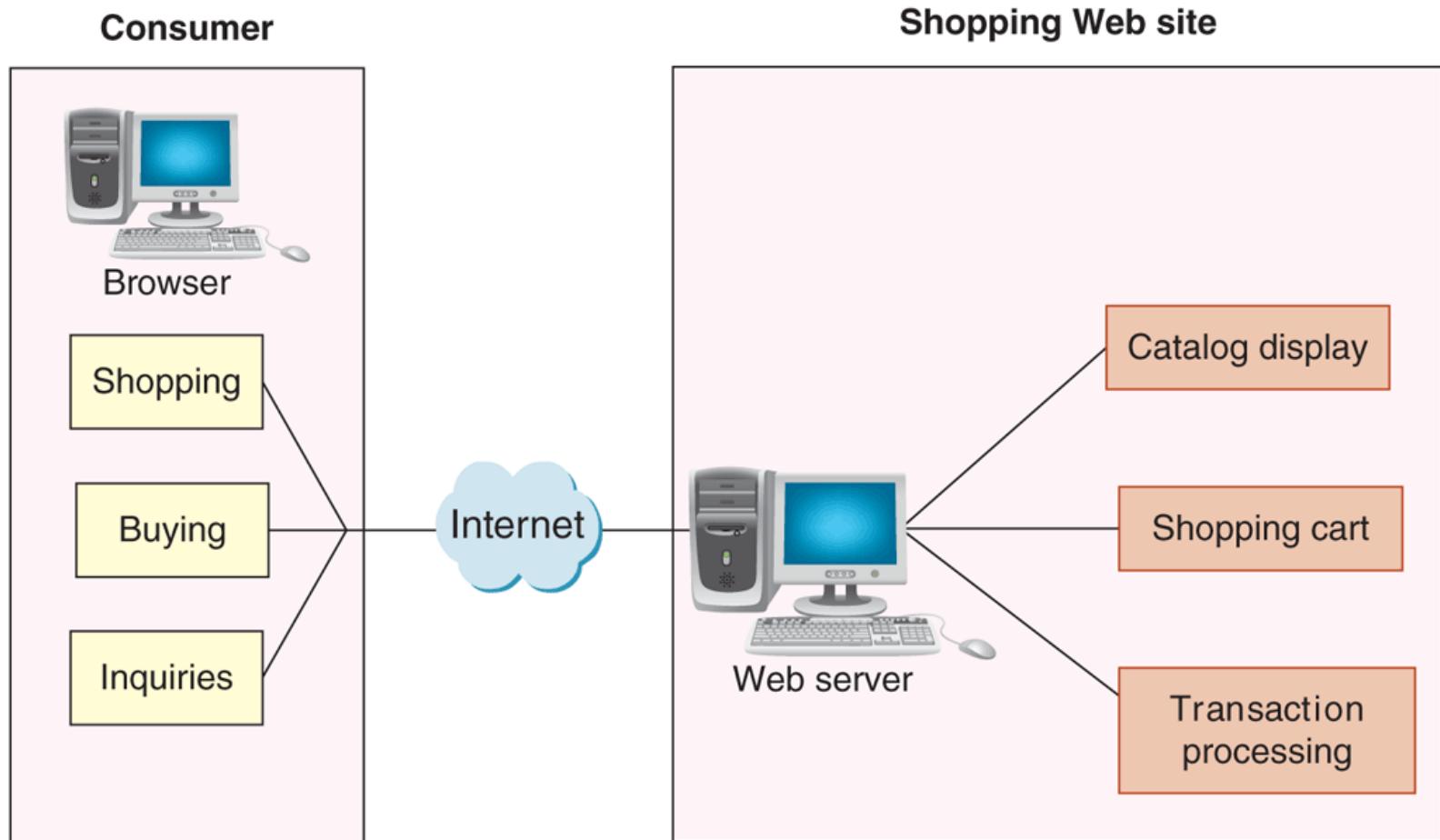
The screenshot shows a shopping cart page with the following layout and data:

- Header:** Home, Your Account, Checkout.
- Breadcrumbs:** Home > Tools > Hand Tools > Drill > 9.6V 3/8" Cordless Driver/Drill with case & flashlight
- Cart Navigation:** Home, Specials, Product Type, Our Company, View Cart.
- Tools By Type:** Drills, Hand Tools, Sanders, Saws.
- Cart Table:** Quantity, Item Name, Number/SKU, Each, Total.
- Items:**
  - Quantity: 1, Item Name: [9.6V 3/8" Cordless Driver/Drill with case & flashlight](#), Number/SKU: FDS10DVAK, Each: \$89.00, Total: \$89.00
  - Quantity: 1, Item Name: [18V Hammer, Drill, Saw Combo Pack](#), Number/SKU: DW4PAK-2, Each: \$499.00, Total: \$499.00
- Total Summary:** Product Total: \$588.00, Discount: -\$29.40, Subtotal: \$558.60, Total: \$558.60.
- Buttons:** continue shopping, checkout ▶.

FIGURE 9-1 Typical shopping cart page

# Transaction Processing

- Occurs when shopper proceeds to virtual checkout counter by clicking the checkout button
  - Electronic commerce software performs calculations
- Web browser software and seller's Web server software switch into secure communication state
  - Electronic commerce software communicates with accounting software sales and inventory modules
  - FedEx and UPS shipping rate software integrates with electronic commerce software
- Other calculations include coupons, promotions, time-sensitive offers



**FIGURE 9-2 Basic electronic commerce site architecture**

# How Electronic Commerce Software Works with Other Software

- Most large companies with electronic commerce operations also have substantial business activity unrelated to electronic commerce
  - Important to integrate electronic commerce activities into the company's other operations
- Basic information system element is a collection of databases

# Databases

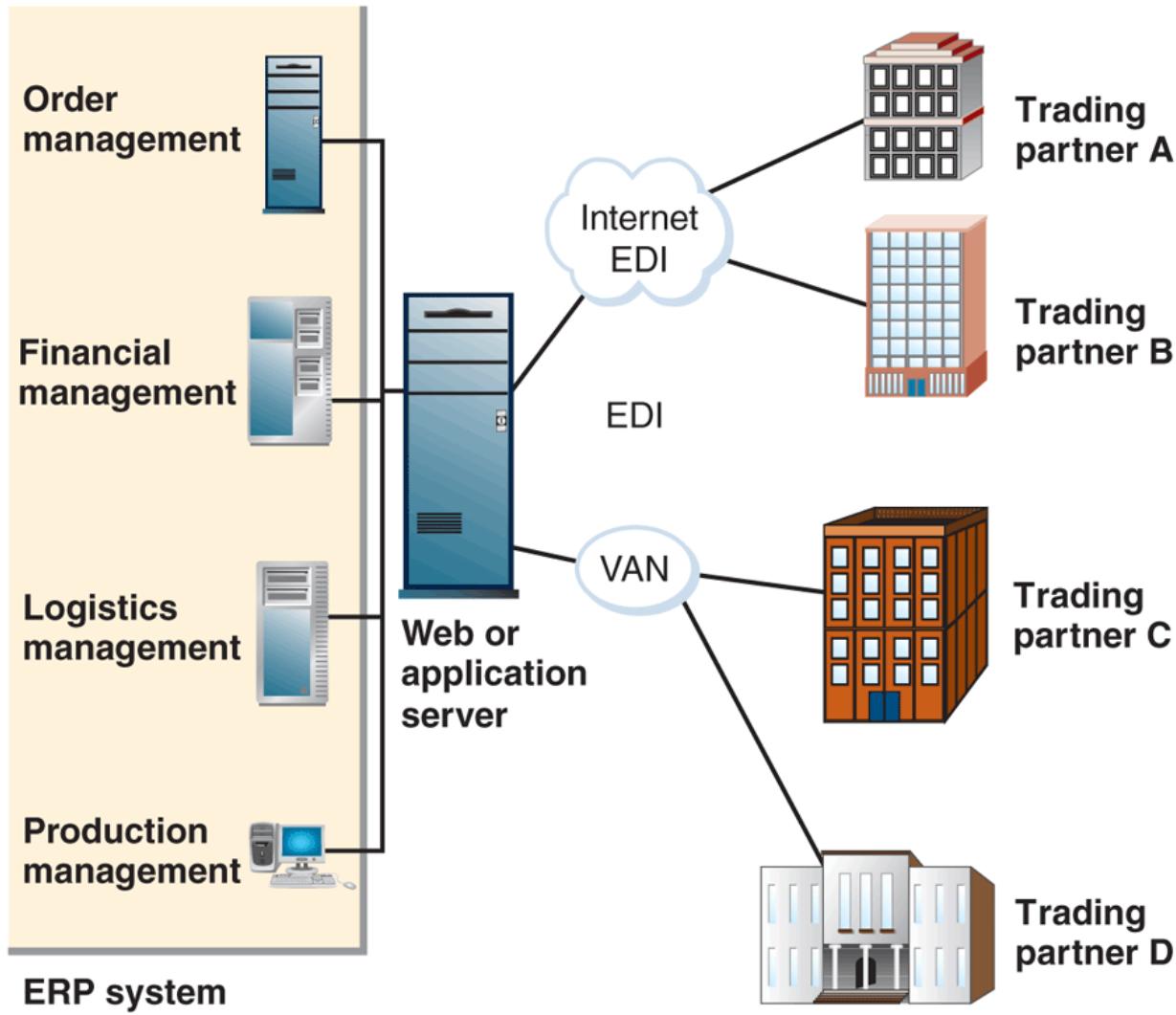
- Highly structured information stored on a computer
- Business rules are how the company does business
- Database management software allows users to enter, edit, update, retrieve database information
- Distributed information systems are large systems storing data in many different physical locations
  - Distributed database systems are databases within distributed information systems
- MySQL database is open-source software owned by Oracle and maintained by group of programmers

# Middleware

- Middleware takes sales and inventory shipments information from electronic commerce software
  - Transmits to accounting and inventory management software
  - Companies can write their own or purchase customized middleware
- Interoperability is making information systems work together
- Middleware cost range is \$30,000 to several millions
  - Depending on complexity and existing systems

# Integration with ERP Systems

- Enterprise resource planning (ERP) software are business systems integrating all facets of a business
  - Accounting, logistics, manufacturing, marketing, planning, project management, and treasury functions
- Two major ERP vendors: Oracle and SAP
  - ERP software installation costs between \$1 million and \$10 million for a midsize company
- Smaller online businesses can purchase products like NetSuite that offer ERP system subscriptions
  - Called software as a service (SaaS)



**FIGURE 9-3** ERP system integration with EDI

# Web Services

- Software systems supporting interoperable machine-to-machine interaction over a network
  - Set of software and technologies allowing computers to use the Web to interact with each other directly
  - Does not require human operators directing the specific interactions
- Application program interface (API) is a general name for the ways programs interconnect with each other
  - Web APIs: interaction over the Web

# Electronic Commerce for Small and Midsize Businesses: Basic CSPs

- Use of service provider's shared or dedicated hosting services
  - Shifts staffing burden from company to Web host
  - Spread costs over all hosted businesses
  - Host provider keeps server working through storms and power outages
- CSPs offer free or low-cost e-commerce software
  - Less than \$20 per month with software built into site
- CSP examples
  - Gate.com, ProHosting.com, 1&1 Internet, Yahoo!

# Mall-Style CSPs

- Provide small businesses with basic Web site, online store design tools, templates and easy-to-use interfaces
  - Low monthly fee, one-time setup fees and percentage (or fixed) amount for each transaction
  - Shopping cart software and payment processing
- Two-main mall-style CSPs are Amazon services for business and eBay stores for businesses
  - No long term commitment and few up-front costs

# Estimating Operating Expenses for a Small Web Business

- Cost to become operational between \$400 and \$8200
  - Assumes less than 100 items for sale and business already has computer and Internet access
  - Figure 9-4 shows the range of estimates for first-year expenses for a small business owners
- Self-hosting include one time basic server and router costs of \$2000 to \$10,000 plus annual costs
  - Basic Internet connection: \$480 to \$1,800
  - Secure server room: \$5000
  - Required technicians: \$50,000 to \$100,000
  - Annual total costs: \$60,000 to \$100,000

<b>Operating Costs</b>	<b>Cost Estimates</b>	
	Low	High
Initial site setup fee	\$ 0	\$ 200
Annual CSP maintenance fee (12 x \$20 to \$300)	240	3600
Domain name registrations	0	300
Scanner for photo conversion or digital camera	60	2000
Photo editing software	0	800
Occasional HTML and site design help	100	1100
Merchant credit card setup fees	0	200
Total first-year costs	\$400	\$8200

**FIGURE 9-4 Approximate costs to put a small store online**

# Electronic Commerce Software for Midsize Businesses: Web Site Development Tools

- Possible to use Web page creation and site management tools.
- After Web site creation add purchased software elements and create the middleware

# Midrange Electronic Commerce Software

- Costs \$5000 to \$200,000
- Operating costs range \$1000 to \$30,000 annually
- Offers connectivity to database or ERP systems that store inventory information
- Intershop offers midrange packages
  - Include search and catalog capabilities, electronic shopping carts, credit card processing and connection to back-end businesses and databases
  - Setup wizards, catalog tools, data management functions and built-in templates are included
  - Manage storefronts with Web browser interface

# Midrange Electronic Commerce Software (cont'd.)

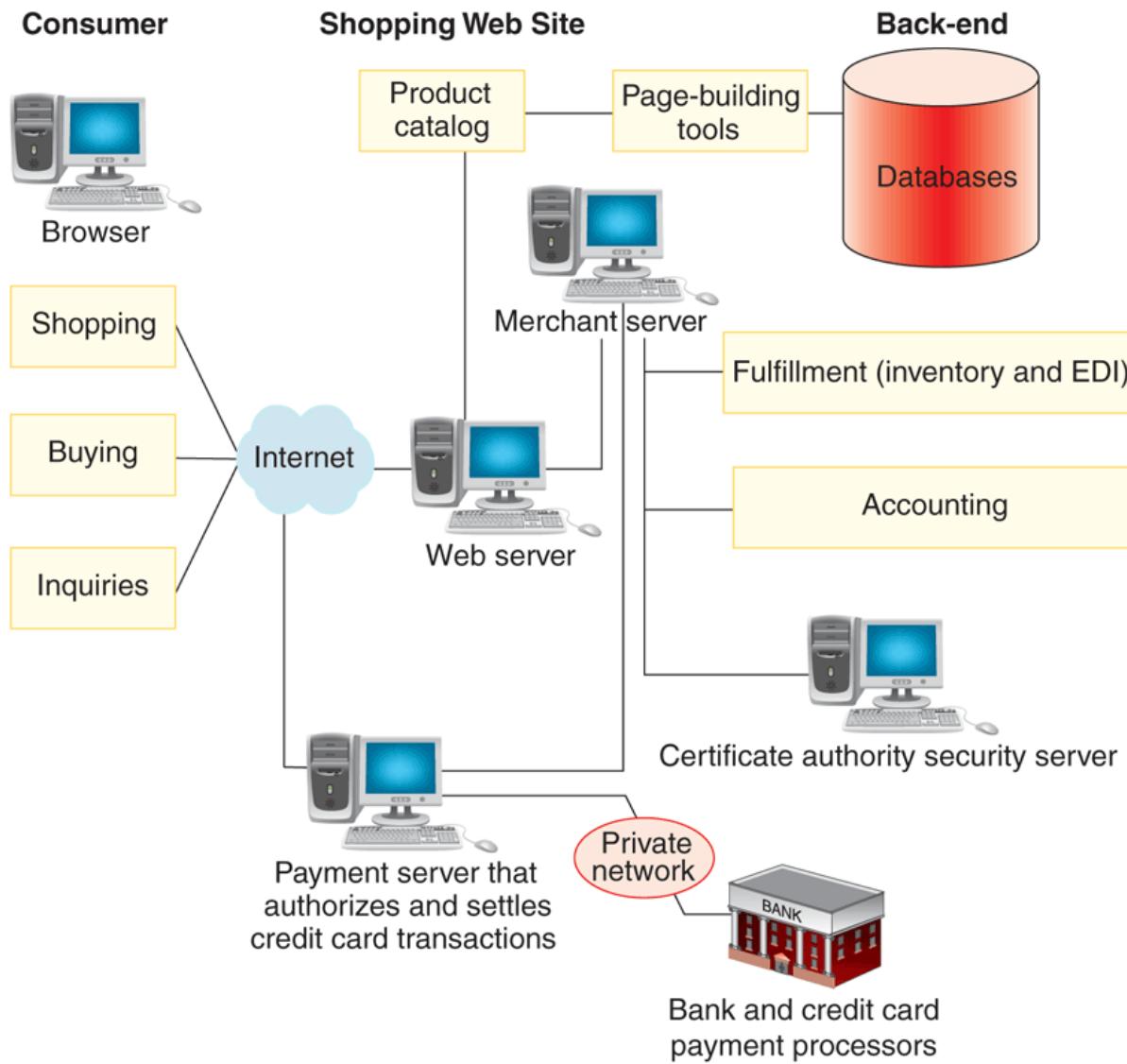
- IBM WebSphere Commerce Professional is a family of software components
  - Includes catalog templates, setup wizards, advanced catalog tools
  - Provides link with existing corporate systems
    - Inventory databases, procurement systems
  - Customization requires programmers with JavaScript, Java or C++ expertise
  - Costs between \$50,000 and \$300,000 depending on number of servers and options

# Electronic Commerce Software for Large Businesses

- Larger business requirement many of the same advanced capabilities as midsize firms
  - Need ability to handle higher transaction loads and dedicated software applications to handle specific online business elements
- Enterprise-class commerce software is used in large online business operations
  - Encompasses all areas of the business or enterprise
  - Provides tools for B2B and B2C commerce
  - Interacts with wide variety of existing systems
  - Costs: \$200,000 to \$10 million

# Enterprise-Class Electronic Commerce Software

- Requires several dedicated computers, Web server system, firewalls
  - IBM WebSphere Commerce Enterprise, Oracle E-Business Suite and Broadvision
- Provides tools for linking to and supporting supply and purchasing activities
  - Secure transaction processing and fulfillment
  - Interaction with firm's inventory system to issue purchase orders
  - Generate accounting entries
  - Download electronic goods directly from site



**FIGURE 9-5 Typical enterprise-class electronic commerce architecture**

# Content Management Software

- Helps control large amounts of text, graphics, media files that have become crucial to doing business
  - Increased use of social media and networking as part of online business operations
- Software should be tested before commitment
  - Straightforward procedures for regular maintenance
  - Facilitates typical content creation tasks
- Leading providers include IBM and Oracle
  - Costs between \$50,000 and \$500,000
  - Can cost 3 to 4 times that amount to customize, configure and implement

# Knowledge Management Software

- Systems that manage knowledge itself rather than the documentary representations of that knowledge
  - Collect, organize and share knowledge
  - Enhance collaboration and preserve knowledge gained through information use to benefit future users
- Tools to read documents and conduct searches
  - Use proprietary semantic, statistical algorithms
- Collects knowledge elements by extracting them from normal interactions users have with information
- Implementation costs \$10,000 to \$1 million or more

# Supply Chain Management Software

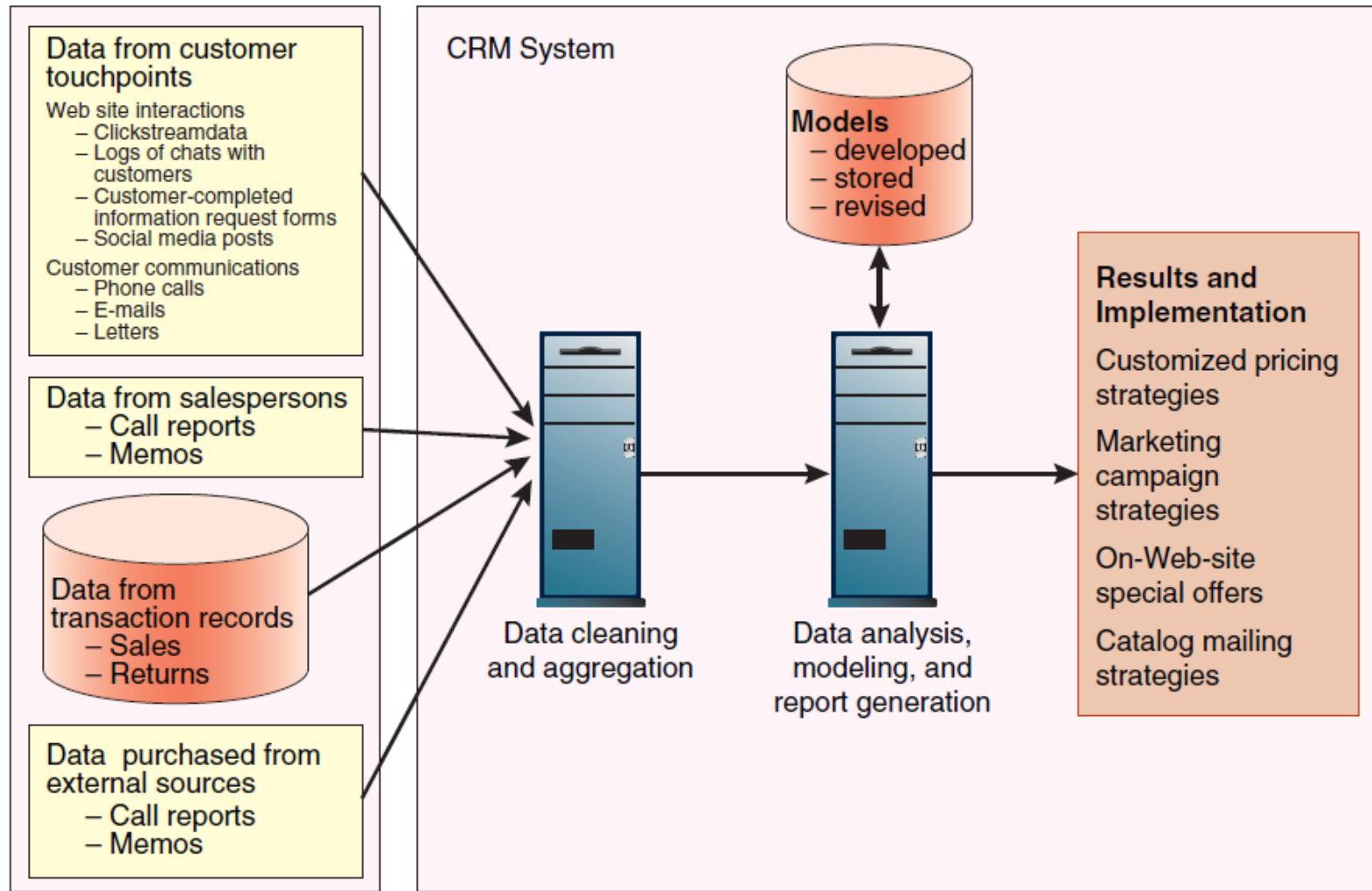
- Helps coordinate planning and operations with supply chain partners
  - SCM planning software develops coordinated demand forecasts
  - SCM execution software helps with warehouse and transportation management
- SCM software components manage demand and supply planning and demand fulfillment
- Cost of SCM software implementations varies tremendously based on number of locations
  - Range from under \$300,000 to \$5 million

# Customer Relationship Management Software

- Goal is to understand customer's specific needs and customize product or service to meet those needs
  - Idea is if customer needs are met exactly they will pay more for goods or services
- Software must obtain data from operations software and gather data about customer activities
  - Use data to conduct analytical activities
- Basic form of CRM uses customer information to sell more goods or services
- Advanced form of CRM delivers attractive, positive customer experiences

# Customer Relationship Management Software (cont'd.)

- Important in maintaining customer loyalty when purchase process is long and complex
- From 1996 to 2000 companies spent millions to buy systems and restructure customer strategies
  - Bad experiences led to a change in thinking
- Now used to solve smaller, more specific problems
  - Popular target is call center operations
- Some companies create their own but most buy a software package
  - Prices start around \$2000 and large implementations can cost millions



**FIGURE 9-6 Elements of a CRM system**

## **SECURITY IN E COMMERCE**

### **1. Ecommerce Security**

E-commerce security is the protection of e-commerce assets from unauthorized access, use, alteration, or destruction.

Six dimensions of e commerce security:

1. Integrity: prevention against unauthorized data modification
2. Nonrepudiation: prevention against any one party from reneging on an agreement after the fact
3. Authenticity: authentication of data source
4. Confidentiality: protection against unauthorized data disclosure
5. Privacy: provision of data control and disclosure
6. Availability: prevention against data delays or removal

## **Introduction to Network Security**

A network security is defined as a circumstance, condition with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste, and abuse.

The discussion of security concerns in electronic commerce can be divided into two broad types: Client/server security uses various authorization methods to make sure that only valid users and programs have access to information resources such as databases. Access control mechanisms must be set up to ensure that properly

authenticated users are allowed access only to those resources that they are entitled to use. Such mechanisms include password protection, encrypted smart cards, biometrics, and firewalls.

Data and transaction security ensures the privacy and confidentiality in electronic messages and data packets, including the authentication of remote users in network transactions for activities such as on-line payments. The goal is to defeat any attempt to assume another identity while involved with electronic mail or other forms of data communication. Preventive measures include data encryption using various cryptographic methods.

## **Client/Server Network Security**

Client/server network security is one of the biggest headaches system administrators face as they balance the opposing goals of user maneuverability and easy access and site security and confidentiality of local information. According to the National Center for Computer Crime Data, computer security violations cost U.S. businesses half a billion dollars each year.

Network security on the Internet is a major concern for commercial organizations, especially top management. Recently, the Internet has raised many new security concerns. By connecting to the Internet, a local network organization may be exposing itself to the entire population on the Internet. As the figure below illustrates, an Internet connection opens itself to access from other networks comprising the public Internet.

Fig: Unprotected Internet Connection Client–server network security problems manifest themselves in three ways:

- 1) Physical security holes result when individuals gain unauthorized physical access to a computer.** A good example would be a public workstation room, where it would be easy for a wandering hacker to reboot a machine into single-user mode and tamper with the files, if precautions are not taken. On the network, this is also a common problem, as hackers gain access to network systems by guessing passwords of various users.
- 2) Software security holes result when badly written programs or "privileged" software are "compromised" into doing things they shouldn't.** The most famous example of this category is the "sendmail" hole, which brought the Internet to its knees in 1988. A more recent problem was the "rlogin" hole in the IBM RS-6000 workstations, which enabled a cracker (a malicious hacker) to create a "root" shell or superuser access mode. This is the highest level of access possible and could be used to delete the entire file system, or create a new account or password file.
- 3) Inconsistent usage holes result when a system administrator assembles a combination of hardware and software such that the system is seriously flawed from a security point of view.** The incompatibility of attempting two unconnected but useful things creates the security hole. Problems like this are difficult to isolate once a system is set up and running, so it is better to carefully build the system with them in mind. This type of problem is becoming common as software becomes more complex.

To reduce these security threats, various protection methods are used. Over the years, several protection methods have been developed, including trust-based security, security through obscurity, password schemes, and biometric systems.

**Trust-Based Security:** Quite simply, trust-based security means to trust everyone and do nothing extra for protection. It is possible not to provide access restrictions of any kind and to assume that all users are trustworthy and competent in their use of the shared network. This approach assumes that no one ever makes an expensive breach such as getting root access and deleting all files (a common hacker trick). This approach worked in the past, when the system administrator had to worry about a limited threat. Today, this is no longer the case.

**Security through Obscurity:** Most organizations in the mainframe era practiced a philosophy known as security through obscurity (STO)—the notion that any network can be secure as long as nobody outside its management group is allowed to find out anything about its operational details and users are provided information on a need-to-know basis. Hiding account passwords in binary files or scripts with the presumption that "nobody will ever find them" is a prime case of STO (somewhat like hiding the house key under the doormat and telling only family and friends). In short, STO provides a false sense of security in computing systems by hiding information.

**Password Schemes:** One straightforward security solution, a password scheme, erects a first- level barrier to accidental intrusion. In actuality, however, password schemes do little about deliberate attack, especially when common words or proper names are selected as passwords. For instance, network administrators at a Texas air force base discovered that they could crack about 70 percent of the passwords on their UNIX network with tools resembling those used by hackers. The simplest method used by most hackers is dictionary comparison— comparing a list of encrypted user passwords against a dictionary of encrypted common words EGCN941. This scheme often works because users tend to choose relatively simple or familiar words as passwords. To beat the dictionary comparison method, experts often recommend using a minimum of eight-character length mixed-case passwords containing at least one non- alphanumeric character and changing passwords every 60 to 90 days.

**Biometric Systems:** Biometric systems, the most secure level of authorization, involve some unique aspect of a person's body. Past biometric authentication was based on comparisons of fingerprints, palm prints, retinal patterns, or on signature verification or voice recognition. Biometric systems are very expensive to implement: At a cost of several thousand dollars per reader station, they may be better suited for controlling physical access—where one biometric unit can serve for many workers—than for network or workstation access. Many biometric devices also carry a high price in terms of inconvenience; for example, some systems take 10 to 30 seconds to verify an access request.

## **Security Threats in Client –Server Systems**

**Mobile Codes** Emerging threat in the e-commerce world is mobile code which in many ways resembles a more traditional virus threat. It is an executable program that has the ability to move from machine to machine and also to invoke itself without external influence. it can be divided into two major categories.

- Threats to local computing environment from mobile software
- Access control and threats to servers that include impersonation, eavesdropping, denial of service, packet relay and packet modification.

## **Threats to Client**

The Internet tends to be the major security threat for running client software as client programs interpret data downloaded from arbitrary servers on the internet. In absence of checks on imported data, the potential exists for this data to disrupt programs running on the systems. Most of the client threats arise from malicious data or code (viruses, worms, Trojan Horse, logic bombs). These codes mistakenly intrude into standalone PCs and have the ability to attack systems on network where the maintenance cost tends to be significant.

## Threats to Servers

Threats to servers consist of unauthorized modification of server data, eavesdropping, modification of data packets and compromise of a server system by exploiting bugs in the server software. They are much more susceptible to attacks where legitimate users are impersonated. Hackers have potential access to a large number of systems. As a result, computers that are not properly configured and running programs with security holes are particularly vulnerable. Hackers can use popular UNIX programs like Finger, rsh or ruser to discover account names and then try to guess simple passwords using a dictionary.

Hackers can spoof or configure a system to masquerade as another system thus gaining unauthorized access to resources or information on systems that trust the system being mimicked.

Hackers can eavesdrop using software that monitors packets sent over the network. Information sent over Telnet or FTP is often sent unencrypted which allows a hacker to make a complete transcript of network activity and obtain sensitive information. The two most common forms of Denial of Service (DOS) attacks are:

**Service overloading:** This may happen to servers for instance, if anyone writes a small loop that sends continuous requests for a particular file. The server tries to respond in good faith. It may also happen due to accidental infinite loops.

**Message flooding:** This occurs when someone sends a very large file to a message box every few minutes. This message box rapidly grows in size and begins to occupy all the space on the disk and increases the number of receiving processes on the recipient's machine, trying it up even more and often causing a disk crash. The best way to avoid message overloading is to provide separate areas for different programs and to make provisions for graceful failure.

## **Security Threats in E Commerce:**

ECommerce refers to the activity of buying and selling things over the internet. Simply, it refers to the commercial transactions which are conducted online. E-commerce can be drawn on many technologies such as mobile commerce, Internet marketing, online transaction processing, electronic funds transfer, supply chain management, electronic data interchange (EDI), inventory management systems, and automated data collection systems.

E-commerce threat is occurring by using the internet for unfair means with the intention of stealing, fraud and security breach. There are various types of e-commerce threats. Some are accidental, some are purposeful, and some of them are due to human error. The most common security threats are an electronic payments system, e-cash, data misuse, credit/debit card frauds, etc.

## **Malicious Code:**

Malicious code is the term used to describe any code in any part of a software system or script that is intended to cause undesired effects, security breaches or damage to a system. Malicious code is an application security threat that cannot be efficiently controlled by conventional antivirus software alone. Malicious code describes a broad category of system security terms that includes attack scripts, viruses, worms, Trojan horses, backdoors and malicious active content.

Malicious code may also include time bombs, hardcoded cryptographic constants and credentials, deliberate information and data leakage, rootkits and anti-debugging techniques. These targeted malicious code threats are hidden in software and mask their presence to evade detection by traditional security technologies.

Once inside your environment, malicious code can enter network drives and propagate. Malicious code can also cause network and mail server overload by sending email messages; stealing data and passwords; deleting document files, email files or passwords; and even reformatting hard drives.

### **Adware:**

Adware, or advertising supported software, is software that displays unwanted advertisements on your computer. Adware programs will tend to serve you pop-up ads, can change your browser's homepage, add spyware and just bombard your device with advertisements. Adware is a more succinct name for potentially unwanted programs. It's not quite a virus and it may not be as obviously malicious as a lot of other problematic code floating around on the Internet. Make no mistake about it, though, that adware needs to come off of whatever machine it's on. Not only can adware be really bothersome every time you use your machine, it could also cause long-term issues for your device.

Adware uses the browser to collect your web browsing history in order to 'target' advertisements that seem tailored to your interests. At their most innocuous, adware infections are just annoying. For example, adware barrages you with pop-up ads that can make your Internet experience markedly slower and more labor intensive.

The most common reason for adware is to collect information about you for the purpose of making advertising dollars. It's called adware when it's on a computer, and madware when it's on a mobile device, such as your smartphone or tablet. No matter what the adware or malware is, it's likely going to slow down your machine and or even make it more prone to crashing.

### **Spyware:**

Spyware is unwanted software that infiltrates your computing device, stealing your internet usage data and sensitive information. Spyware is classified as a type of malware — malicious software designed to gain access to or damage your

computer, often without your knowledge. Spyware gathers your personal information and relays it to advertisers, data firms, or external users.

Spyware is used for many purposes. Usually it aims to track and sell your internet usage data, capture your credit card or bank account information, or steal your personal identity. How? Spyware monitors your internet activity, tracking your login and password information, and spying on your sensitive information.

Some types of spyware can install additional software and change the settings on your device, so it's important to use secure passwords and keep your devices updated.

If you've ever been a victim of identity theft or credit card fraud, you're not alone. Cybercrime statistics tell the story:

- A total of 978 million people in 20 countries were affected by cybercrime in 2017, according to Norton Cyber Security Insights Report Global Results.
- Victims of cybercrime globally lost \$172 billion.

Spyware contributed to those numbers.

Spyware is one of the most common threats on the internet. It can easily infect your device and it can be hard to identify. Spyware is a threat to businesses and individual users, since it can steal sensitive information and harm your network.

Check out our guide to help understand how spyware works, how to remove it, and how to help protect yourself or your business.

There are four main types of spyware. Each uses unique tactics to track you.

- **Adware.** This type of spyware tracks your browser history and downloads, with the intent of predicting what products or services you're interested in. The adware will display advertisements for the same or related products or services to entice you to click or make a purchase. Adware is used for marketing purposes and can slow down your computer.
- **Trojan.** This kind of malicious software disguises itself as legitimate software. For example, Trojans may appear to be a Java or Flash Player update upon download. Trojan malware is controlled by third parties. It can

be used to access sensitive information such as Social Security numbers and credit card information.

- **Tracking cookies.** These track the user's web activities, such as searches, history, and downloads, for marketing purposes.
- **System monitors.** This type of spyware can capture just about everything you do on your computer. System monitors can record all keystrokes, emails, chat-room dialogs, websites visited, and programs run. System monitors are often disguised as freeware.

## **Social Engineering**

In the context of information security, social engineering is the psychological manipulation of people into performing actions or divulging confidential information. This differs from social engineering within the social sciences, which does not concern the divulging of confidential information. A type of confidence trick for the purpose of information gathering, fraud, or system access, it differs from a traditional "con" in that it is often one of many steps in a more complex fraud scheme.

It has also been defined as "any act that influences a person to take an action that may or may not be in their best interests."

An example of social engineering is the use of the "forgot password" function on most websites which require login. An improperly-secured password-recovery system can be used to grant a malicious attacker full access to a user's account, while the original user will lose access to the account.

## **Phishing:**

**Phishing** is the fraudulent attempt to obtain sensitive information or data, such as usernames, passwords and credit card details or other sensitive details, by impersonating oneself as a trustworthy entity in a digital communication. Typically carried out by email spoofing, instant messaging, and text messaging, phishing

often directs users to enter personal information at a fake website which matches the look and feel of the legitimate site,

Phishing is an example of social engineering techniques used to deceive users. Users are lured by communications purporting to be from trusted parties such as social networking websites, auction sites, banks, mails/messages from friends or colleagues/executives, online payment systems or IT administrators.

Attempts to deal with phishing incidents include legislation, user training, public awareness, and technical security measures (the latter being due to phishing attacks frequently exploiting weaknesses in current web security).

## Spoofing

Spoofing is a type of scam in which criminals attempt to obtain someone's personal information by pretending to be a legitimate business, a neighbor, or some other innocent party.

### Types of Spoofing

#### Email Spoofing

Sometimes referred to as phishing, this tactic is used by both dishonest advertisers and outright thieves. The spoofer sends out emails with a falsified “From:” line to try to trick victims into believing that the message is from a friend, their bank, or some other legitimate source. Any email that asks for your password, Social Security number, or any other personal information could be a trick.

#### Text Message Spoofing

Sometimes referred to as smishing, this is similar to email spoofing. The text message may appear to come from a legitimate source, such as your bank. It may

request that you call a certain phone number or click on a link within the message, with the goal of getting you to divulge personal information.

### Caller ID Spoofing

Here, the spoofers falsifies the phone number from which they are calling in hope of getting you to take their call. On your caller ID, it might appear that the call is coming from a legitimate business or government agency, such as the Internal Revenue Service. Note that the IRS says it doesn't call taxpayers to tell them they owe taxes without first sending them a bill in the mail.

### Neighbor Spoofing

This is a type of caller ID spoofing in which the call will appear to be from someone you know or a person who lives near you. The Federal Communications Commission (FCC) says that the Truth in Caller ID Act prohibits "anyone from transmitting misleading or inaccurate caller ID information with the intent to defraud, cause harm or wrongly obtain anything of value." If they're caught (and that's a big "if"), the spoofers can face penalties of up to \$10,000 for each violation.

### URL Spoofing

URL spoofing happens when scammers set up a fraudulent website to obtain information from victims or to install malware on their computers. For instance, victims might be directed to a site that looks like it belongs to their bank or credit card company and be asked to log in using their user ID and password. If the person falls for it and actually logs in, the scammer could use the information the victim typed in to log into the real site and access their accounts.

### GPS Spoofing

GPS spoofing has a somewhat different purpose. It attempts to trick a GPS receiver into believing it is in a different location or headed in a different direction, by

broadcasting bogus GPS signals or other means. At this point, GPS spoofing is more likely to be used in warfare or by gamers than to target individual consumers, although the technology exists to make anyone vulnerable.

## **Pharming**

Pharming is a scamming practice in which malicious code is installed on a personal computer or server, misdirecting users to fraudulent Web sites without their knowledge or consent. Pharming has been called "phishing without a lure."

## **Data and Message Security (Private or Secret and Public Key Cryptography)**

The lack of data and message security on the Internet has become a high-profile problem due to the increasing number of merchants trying to spur commerce on the global network. For instance, credit card numbers in their plain text form create a risk when transmitted across the Internet where the possibility of the number falling into the wrong hands is relatively high. Would you be willing to type in your credit card number knowing the risk? Even worse, would you expose your customers to that risk? In short, the lack of business transaction security is widely acknowledged as a major impediment to widespread e-commerce.

Historically, computer security was provided by the use of account passwords and limited physical access to a facility to bona fide users. As users began to dial in from their PCs and terminals at home, these measures were deemed sufficient. With the advent of remote users on internetworks, commercial transactions, mobile computers, and wireless technologies, simple password schemes are not sufficient to prevent attacks from sophisticated hackers.

Interestingly, the security problems plaguing network administrators resemble the problems facing transaction-based electronic commerce. Credit card numbers are similar to passwords in many ways. A growing threat on today's public (and sometimes even private) networks is the theft of passwords and other information that passes over them. Today's hacker has an array of tools to reach and manipulate information from remote sites as well as to engage in unauthorized eavesdropping. Unsuspecting and amateur users logging into remote hosts are the most vulnerable.

Transaction security issues can be divided into two types: data and message security. These are discussed below.

**Data Security:** Electronic data security is of paramount importance at a time when people are considering banking and other financial transactions by PCs. Also, computer industry trends toward distributed computing, and mobile computers, users face security challenges. One major threat to data security is unauthorized network monitoring, also called packet sniffing.

Sniffer attacks begin when a computer is compromised and the cracker installs a packet sniffing program that monitors the network to which the machine is attached. The sniffer program watches for certain kinds of network traffic, typically for the first part of any Telnet, FTP, or rlogin sessions—sessions that legitimate users initiate to gain access to another system. The first part of the session contains the log-in ID, password, and user name of the person logging into another machine, all the necessary information a sniffer needs to log into other machines. In the course of several days, the sniffer could gather information on local users logging into remote machines. So, one insecure system on a network can expose to intrusion not only other local machines but also any remote systems to which the users connect.

The fact that someone can extract meaningful Information from network traffic is nothing new. Network monitoring can rapidly expand the number of systems intruders are able to access, all with only minimal impact on the systems on which the sniffers are installed and with no visible impact on the systems being monitored. Users whose accounts and passwords are collected will not be aware that their sessions are being monitored, and subsequent intrusions will happen via legitimate accounts on the machines involved.

## **Message Security:**

Threats to message security fall into three categories:

1. confidentiality,
2. integrity, and
3. authentication.

**1. Message Confidentiality**- Confidentiality is important for uses involving sensitive data such as credit card numbers. This requirement will be amplified when other kinds of data, such as employee records, government files, and social security numbers, begin traversing the network. Confidentiality precludes access to, or release of, such information to unauthorized users.

The environment must protect all message traffic. After successful delivery to their destination gateways, messages must be removed (expunged) from the public environment. All that remains is the accounting record of entry and delivery, including message length, authentication data, but no more. All message archiving must be performed in well-protected systems.

The vulnerability of data communications and message data to interception is exacerbated with the use of distributed networks and wireless links. The need for securing the communications link between computers via encryption is expected to rise.

**2. Message and System Integrity**- Business transactions require that their contents remain unmodified during transport. In other words, information received must have the same content and organization as information sent. It must be clear that no one has added, deleted, or modified any part of the message.

While confidentiality protects against the passive monitoring of data, mechanisms for integrity must prevent active attacks involving the modification of data. Error detection codes or checksums, sequence numbers, and encryption techniques are methods to enhance information integrity. Encryption techniques such as digital signatures can detect modifications of a message. .

**3. Message Sender Authentication/Identification**- For e-commerce, it is important that clients authenticate themselves to servers, that servers authenticate to clients, that both authenticate to each other. Authentication is a mechanism whereby the receiver of a transaction or message can be confident of the identity of the sender and/or the integrity of the message. In other words, authentication verifies the identity of an entity (a user or a service) using certain encrypted information transferred from the sender to the receiver.

Authentication in e-commerce basically requires the user to prove his or her identity for each requested service. The race among various vendors in the e-commerce today is to provide an authentication method that is easy to use, secure, reliable, and scalable. Third-party authentication services must exist

within a distributed network environment where a sender cannot be trusted to identify itself correctly to a receiver. In short, authentication plays an important role in the implementation of business transaction security.

## **Encryption Techniques for Data and Message Security**

### **(Private and Public Key Cryptography)**

The success or failure of an e-commerce operation depends on different key factors, including but not limited to the business model, the team, the customers, the investors, the product, and the security of data transmissions and storage. Data security has taken on heightened importance since a series of high-profile "cracker" attacks have humbled popular Web sites, resulted in the impersonation of Microsoft employees for the purposes of digital certification, and the misuse of credit card numbers of customers at business-to-consumer e-commerce destinations. Security is on the mind of every e-commerce entrepreneur who solicits, stores, or communicates any information that may be sensitive if lost. Technologists are building new security measures while others are working to crack the security systems. One of the most effective means of ensuring data security and integrity is encryption.

Encryption is a generic term that refers to the act of encoding data, in this context so that those data can be securely transmitted via the Internet. Encryption can protect the data at the simplest level by preventing other people from reading the data. In the event that someone intercepts a data transmission and manages to deceive any user identification scheme, the data that they see appears to be gibberish without a way to decode it. Encryption technologies can help in other

ways as well, by establishing the identity of users (or abusers); control the unauthorized transmission or forwarding of data; verify the integrity of the data (i.e., that it has not been altered in any way); and ensure that users take responsibility for data that they have transmitted.

Encryption can therefore be used either to keep communications secret (defensively) or to identify people involved in communications (offensively). Encryption Provide Following Security:

- Message Integrity: provides assurance that the message has not been altered.
- Non repudiation: prevents the users from denying he/she sent the message
- Authentication: provides verification of the identity of the person (or machine) sending the message.
- Confidentiality: give assurance that the message was not read by others.

There are two types of encryption: symmetric key encryption and asymmetric key encryption. Symmetric key and asymmetric key encryption are used, often in conjunction, to provide a variety of security functions for data and message security in e-commerce.

## Symmetric Key Encryption (Private or Secret Key Encryption):

Encryption algorithms that use the same key for encrypting and for decrypting information are called symmetric-key algorithms. The symmetric key is also called a secret key because it is kept as a shared secret between the sender and receiver of information. Otherwise, the confidentiality of the encrypted information is compromised. Figure below shows basic symmetric key encryption and decryption.

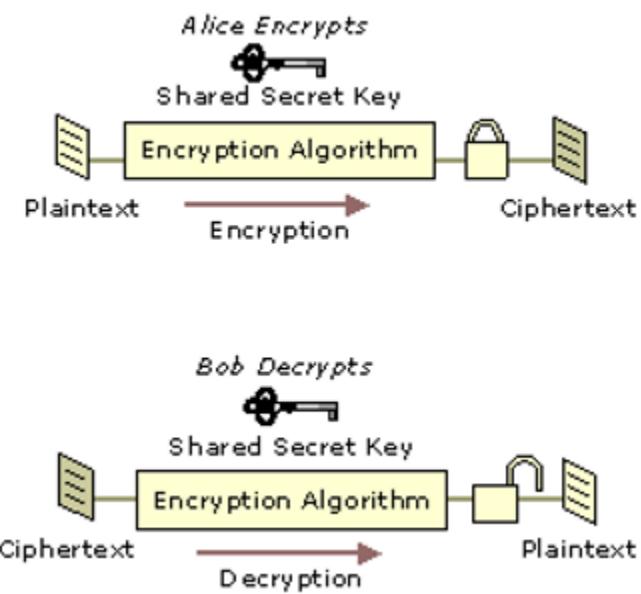


Fig: Encryption and Decryption with a Symmetric Key

Symmetric key encryption is much faster than public key encryption, often by 100 to 1,000 times. Symmetric key technology is generally used to provide secrecy for the bulk encryption and decryption of information.

Cryptography-based security technologies use a variety of symmetric key encryption algorithms to provide confidentiality. Symmetric algorithms have the advantage of not consuming too much computing power. People can use this encryption method as either a "stream" cipher or a "block" cipher, depending on the amount of data being encrypted or decrypted at a time. A stream cipher encrypts data one character at a time as it is sent or received, while a block cipher processes fixed block (chunks) of data. Common symmetric encryption algorithms include Data Encryption Standard (DES), Advanced Encryption Standard (AES), and International Data Encryption Algorithm (IDEA).

### **Asymmetric Key Encryption(Public Key Encryption):**

Encryption algorithms that use different keys for encrypting and decrypting information are most often called public-key algorithms but are sometimes also called *asymmetric key algorit*. Public key encryption requires the use of both a private key (a key that is known only to its owner) and a public key (a key that is available to and known to other entities on the network). A user's public key, for example, can be published in the directory so that it is accessible to other people in the organization. The two keys are different but complementary in function. Information that is encrypted with the public key can be decrypted only with the corresponding private key of the set. Figure below shows basic encryption and decryption with asymmetric keys.

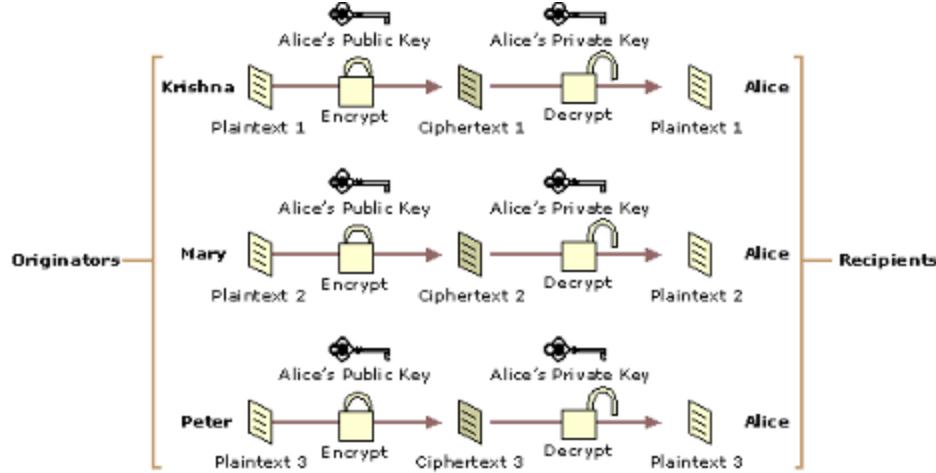


Fig: Encryption and Decryption with Asymmetric Keys

Today, public key encryption plays an increasingly important role in providing strong, scalable security on intranets and the Internet. Public key encryption is commonly used to perform the following functions:

- Encrypt symmetric secret keys to protect the symmetric keys during exchange over the network.
- Create digital signatures to provide authentication and non-repudiation for online entities.
- Create digital signatures to provide data integrity for electronic files and documents.

Algorithms that use public key encryption methods include RSA and Diffie-Hellman.

## Common Cryptosystems

- a) **RSA Algorithm:** RSA is the most commonly used public key algorithm, although it is vulnerable to attack. Named after its inventors, Ron Rivest, Adi Shamir and Len Adleman, of the MIT, RSA was first published in 1978. It is used for encryption as well as for electronic signatures

(discussed later). RSA lets you choose the size of your public key. The 512-bit keys are considered insecure or weak. The 768-bit keys are secure from everything but 1024-bit keys are secure from virtually anything.

- b)** Data Encryption Standards (DES): DES was developed by IBM in 1974 in response to a public solicitation from the US Department of Commerce. It was adopted as a US federal standard in 1977 and as a financial industry standard in 1981. DES uses a 56-bit key to encrypt.
- c)** 3DES: A stronger version of DES, called 3DES or Triple DES, uses three 56-bit keys to encrypt each block. The first key encrypts the data block, the second key decrypts the data block, and the third key encrypts the same data block again. The 3DES version requires a 168-bit key that makes the process quite secure and much safer than plain DES.
- d)** RC4: RC4 was designed by Ron Rivest RSA Data Security Inc. this variable-length cipher is widely used on the Internet as the bulk encryption cipher in the SSL protocol, with key length ranging from 40 to 128 bits. RC4 has a repudiation of being very fast.
- e)** IDEA: IDEA (International Data Encryption Algorithm) was created in Switzerland in 1991. it offers very strong encryption using 1 128-bit key to encrypt 64-bit blocks. This system is widely used as the bulk encryption cipher in older version of Pretty Good Privacy (PGP)

## **Digital Signature**

Just as handwritten signatures or physical thumbprints are commonly used to uniquely identify people for legal proceedings or transactions, so digital signatures are commonly used to identify electronic entities for online transactions. A digital signature uniquely identifies the originator of digitally signed data and also ensures the integrity of the signed data against tampering or corruption.

One possible method for creating a digital signature is for the originator of data to create the signature by encrypting all of the data with the originator's private key and enclosing the signature with the original data. Anyone with the originator's public key can decrypt the signature and compare the decrypted message to the original message. Because only someone with the private key can create the signature, the integrity of the message is verified when the decrypted message matches the original. If an intruder alters the original message during transit, the intruder cannot also create a new valid signature. If an intruder alters the signature during transit, the signature does not verify properly and is invalid.

However, encrypting all data to provide a digital signature is impractical for following two reasons:

- The ciphertext signature is the same size as the corresponding plaintext, so message sizes are doubled, consuming large amounts of bandwidth and storage space.
- Public key encryption is slow and places heavy computational loads on computer processors.

Digital signature algorithms use more efficient methods to create digital signatures. The most common types of digital signatures today are created by signing message digests with the originator's private key to create a digital thumbprint of the data. Because only the message digest is signed, the signature is usually much shorter than the data that was signed. Therefore, digital signatures place a relatively low load on computer processors during the signing process, consume insignificant amounts of bandwidth. Two of the most widely used digital signature algorithms today are the RSA digital signature process and the Digital Signature Algorithm (DSA).

**RSA Data Security Digital Signature Process:** In the RSA digital signature process, the private key is used to encrypt only the message digest. The encrypted message digest becomes the digital signature and is attached to the original data. Figure below illustrates the basic RSA Data Security digital signature process.

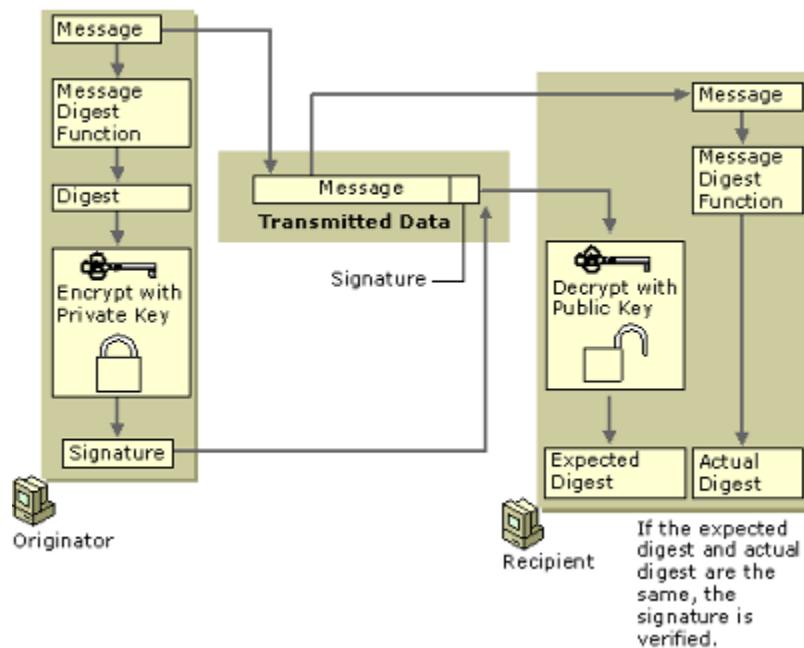


Fig: Basic RSA Data Security Digital Signature Process

To verify the contents of digitally signed data, the recipient generates a new message digest from the data that was received, decrypts the original message digest with the originator's public key, and compares the decrypted digest with the newly generated digest. If the two digests match, the integrity of the message is verified. The identification of the originator also is confirmed because the public key can decrypt only data that has been encrypted with the corresponding private key.

### **Digital Certificate and Certification Authority**

Digital certificates are electronic credentials that are used to assert the online identities of individuals, computers, and other entities on a network. Digital certificates function similarly to identification cards such as passports and drivers licenses. Most commonly they contain a public key and the identity of the owner. They are issued by certification authorities (CAs) that must validate the identity of the certificate-holder both before the certificate is issued and when the certificate is used. Common uses include business scenarios requiring authentication, encryption, and digital signing.

Most certificates in common use today are based on the X.509v3 certificate standard. X.509v3 stands for version 3 of the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) recommendation X.509 for certificate syntax and format. Typically, certificates contain the following information:

- The subject's public key value
- The subject's identifier information, such as the name and email address

- The validity period (the length of time that the certificate is considered valid)
- Issuer identifier information
- The digital signature of the issuer, which attests to the validity of the binding between the subject's public key and the subject's identifier information

Process to obtain a Certificate From CA: One can obtain a certificate for your business from commercial CAs. The Issuing entities of commercial CAs provide certificate with a cost. User can generate a Key pair of its own and generate a Certificate Signing Request (CSR) and then send the CSR to Issuing CA for a certificate. CSR contains the public key of the user and user identity information in a format that issuing CAs would normally expect as shown in figure below.

A Certificate Authority (CA) issues digital certificates that contain a public key and the identity of the owner. The matching private key is not made available publicly, but kept secret by the end user who generated the key pair. The certificate is also a confirmation or validation by the CA that the public key contained in the certificate belongs to the person, organization, server or other entity noted in the certificate. A CA's obligation in such schemes is to verify an applicant's credentials, so that users and relying parties can trust the information in the CA's certificates. CAs use a variety of standards and tests to do so. In essence, the Certificate Authority is responsible for saying "yes, this person is who they say they are, and we, the CA, verify that".

If the user trusts the CA and can verify the CA's signature, then he can also verify that a certain public key does indeed belong to whoever is identified in the certificate. Browsers maintain list of well known CAs root certificates. Aside from commercial CAs, some providers issue digital certificates to the public at no cost. Large institutions or government entities may have their own CAs.

## **Using Certificates for Secure Web Communications (SSL)**

Secure Sockets Layer (SSL) and Transport Layer Security (TLS) are protocols that are used to provide secure Web communications on the Internet or intranets. TLS is the standardized (on the Internet Engineering Task Force—IETF—level) version of SSL. TLS is also referred to as SSL version 3.1, whereas the most commonly used SSL version is 3.0. Both protocols can provide the following basic security services:

- Mutual authentication. Verifies the identities of both the server and client through exchange and validation of their digital certificates.
- Communication privacy. Encrypts information exchanged between secure servers and secure clients using a secure channel.
- Communication integrity. Verifies the integrity of the contents of messages exchanged between client and server, which ensures that messages haven't been altered en route.

Sample Scenario Example: Here's an example of an environment using SSL/TLS. When you use the Internet for online banking, it's important to know that your Web browser is communicating directly and securely with your bank's Web server. Your Web browser must be able to achieve Web server authentication before a safe transaction can occur. That is, the Web server must be able to prove its identity to

your Web browser before the transaction can proceed. Microsoft IE uses SSL to encrypt messages and transmit them securely across the Internet, as do most other modern Web browsers and Web servers.

### Secure Electronic Transmission (SET)

The Secure Electronic Transmission protocol imitates the current structure of the credit card processing system. SET makes banks by default one of the major distributors of certificates. When a user might change organizations or lose his or her key pair, or an e-commerce site using SSL may discontinue its operations; a certificate must be revoked before it expires. In all these cases, the certificate needs to be revoked before it expires so that it cannot be used intentionally or unintentionally.

The most important property of SET is that the credit card number is not open to the seller. On the other hand, the SET protocol, despite strong support from Visa and MasterCard, has not appeared as a leading standard.

The two major reasons for lack of widespread acceptance are followings:

- (1) The complexity of SET
- (2) The need for the added security that SET provides.

Though, this might change in the future as encryption technology becomes more commonly utilized in the e-business world.

**Advantages of SET:** Some of the advantages of SET contain the following:

1. Information security: Neither anyone listening in nor a merchant can use the information passed during a transaction for fraud.
2. Credit card security: There is no chance for anybody to steal a credit card.
3. Flexibility in shopping: If a person has a phone he/she can shop.

**Disadvantages of SET:** Some of the disadvantages of SET include its complexity and high cost for implementation.



## **Digital Marketing**

Digital marketing is the use of the Internet, mobile devices, social media, search engines, and other channels to reach consumers. Some marketing experts consider digital marketing to be an entirely new endeavor that requires a new way of approaching customers and new ways of understanding how customers behave compared to traditional marketing.

### **Different Channels of Digital Marketing**

#### **Website Marketing**

A website is the centerpiece of all digital marketing activities. Alone, it is a very powerful channel, but it's also the medium needed to execute a variety of online marketing campaigns. A website should represent a brand, product, and service in a clear and memorable way. It should be fast, mobile-friendly, and easy to use.

#### **Pay-Per-Click (PPC) Advertising**

PPC advertising enables marketers to reach Internet users on a number of digital platforms through paid ads. Marketers can set up PPC campaigns on Google, Bing, LinkedIn, Twitter, Pinterest, or Facebook and show their ads to people searching for terms related to the products or services. PPC campaigns can segment users based on their demographic characteristics (such as by age or gender), or even target their particular interests or location. The most popular PPC platforms are Google Ads and Facebook Ads.

#### **Content Marketing**

The goal of content marketing is to reach potential customers through the use of content. Content is usually published on a website and then promoted through social media, email marketing, SEO, or even PPC campaigns. The tools of content marketing include blogs, ebooks, online courses, infographics, podcasts, and webinars.

## **Email Marketing**

Email marketing is still one of the most effective digital marketing channels. Many people confuse email marketing with spam email messages, but that's not what email marketing is all about. Email marketing is the medium to get in touch with your potential customers or the people interested in your brand. Many digital marketers use all other digital marketing channels to add leads to their email lists and then, through email marketing, they create customer acquisition funnels to turn those leads into customers.

## **Social Media Marketing**

The primary goal of a social media marketing campaign is brand awareness and establishing social trust. As you go deeper into social media marketing, you can use it to get leads or even as a direct sales channel.

## **Affiliate Marketing**

Affiliate marketing is one of the oldest forms of marketing, and the Internet has brought new life to this old standby. With affiliate marketing, influencers promote other people's products and get a commission every time a sale is made or a lead is introduced. Many well-known companies like Amazon have affiliate programs that pay out millions of dollars per month to websites that sell their products.

## **Video Marketing**

YouTube has become the second most popular search engine and a lot of users are turning to YouTube before they make a buying decision, to learn something, read a review, or just to relax. There are several video marketing platforms, including Facebook Videos, Instagram, or even TikTok to use to run a video marketing campaign. Companies find the most success with video by integrating it with SEO, content marketing, and broader social media marketing campaigns.

## **SMS Messaging**

Companies and nonprofit organizations also use SMS or text messages to send information about their latest promotions or giving opportunities to willing

customers. Political candidates running for office also use SMS message campaigns to spread positive information about their own platforms. As technology has advanced, many text-to-give campaigns also allow customers to directly pay or give via a simple text message.

## **Digital Marketing Challenges? Research!**

### **Types of Digital Marketing**

#### **Search Engine Optimization (SEO)**

The goal of SEO is to get a business to rank higher in Google search results, ultimately increasing search engine traffic to the business's website. To accomplish this, SEO marketers research words and phrases consumers are using to search for information online, and use those terms in their own content. According to leading SEO software company Moz's "Beginners Guide to SEO," SEO encompasses many elements, from the words on your web pages to the way other sites link to you on the web to how your website is structured. An SEO specialist can make around \$59,000, according to Salary.com.

So, what are some things that can improve a site's SEO? It's important to understand that one of the things that makes SEO challenging is that the answer to this question always depends on Google and its most current algorithm. Keeping that in mind, here are a few of the most important things for SEO strategists and

marketers in general to understand about how SEO works today, from Moz's Beginners Guide to SEO:

- Content indexing – It is important to allow search engines to clearly “read” what your site content is, by doing things like adding alt text for images and text transcripts for video and audio content.
- Good link structure – It is important that search engines can “crawl” your site structure to easily find all the content on your site. There are many things that an SEO specialist can do to properly format links, URLs, and sitemaps to make them most accessible to site crawlers.
- Keywords and keyword targeting – Properly deploying your keywords – i.e. the search terms you want your site to be found for—in your content and headers is one of the fundamental building blocks of SEO. It is no longer good practice to “stuff” your content with as many keywords and keyword variations as possible. Writing high-quality content that uses keywords in the headers and a few times in the crawl-able page content is now considered better practice, and will make pages rank better in search results.

## **Pay-per-Click (PPC)**

Pay-per-click refers to paid advertisements and promoted search engine results. This is a short-term form of digital marketing, meaning that once you are no longer paying, the ad no longer exists. Like SEO, PPC is a way to increase search traffic to a business online.

Pay-per-click can refer to the advertisements you see at the top and sides of a page of search results, the ads you see while browsing the web, ads before YouTube videos and in ads in mobile apps.

One of the other things that differentiates pay-per-click from SEO is that you only pay for the results. In a typical PPC model like a Google AdWords campaign, you will pay only when someone clicks on your ad and lands on your website. You can spend just about any amount of money on pay-per-click advertising. Some companies may see results from investing just a few hundred dollars, but plenty of large companies spend tens of thousands a month on pay-per-click.

How much it costs to run an ad or promote your search results will depend primarily on how much competition there is for your keywords. High competition keywords (i.e. keywords that many people are searching for and that many sites are trying to be found for) will be more expensive and lower competition terms will likely cost less.

When you set up a pay-per-click campaign, you will also be able to choose whether you want your ad or promoted results to be shown to users all over the world, or only within a specific geographic area. If you are marketing a brick-and-mortar business, this ability to tailor by location helps you not waste ad dollars serving ads to users who don't live anywhere near your business, according to Google.

## **Social Media Marketing**

This includes everything a business does via social media channels. Just about everyone is familiar with social media, but marketers must approach social with an integrated and strategic approach. Social media marketing goes far beyond simply creating posts for social channels and responding to comments.

To be effective, efforts must be coordinated and consistent rather than an afterthought. To help keep posts consistent, there are many online tools available to automate and schedule social media posts, although marketers only should use automation as a tool, not a "set it and forget it" solution. Users will figure it out quickly if there is no real person behind the posts.

Social media marketers should not be in a silo separate from other marketing functions. Social marketers need to work with the company's wider marketing team to coordinate their message across all platforms, online and off, so that every part of the brand is telling the same story.

A crucial part of social media marketing is analytics: Social media marketers must also be savvy at analyzing the performance of their posts, and creating strategies based on that data. Another reason for marketers to be consistently measuring and

tracking their campaigns is that this data allows marketers to demonstrate to business leadership that their efforts are driving users to engage with the brand and eventually converting users into customers, therefore providing value to the company, according to Forbes contributor Jayson DeMers.

In other words, social media marketing is a lot more complicated than managing your personal Facebook or Twitter profile. It requires a blend of creative thinking and objective, data-driven strategy, and may be a great fit for professionals who enjoy blending these two disciplines. A social media analyst with a bachelor's degree can earn about \$63,841, according to Salary.com.

## **Content Marketing**

Content marketing uses storytelling and information sharing to increase brand awareness. Ultimately, the goal is to have the reader take an action towards becoming a customer, such as requesting more information, signing up for an email list, or making a purchase. “Content” can mean blog posts, resources like white papers and ebooks, digital video, podcasts, and much more. In general, it should first and foremost provide value to the consumer, not just advertise the brand or try to make a sale. Content marketing is about building a sustainable, trusting relationship with your customers that can potentially lead to many sales over time, not just making a single transaction.

Content marketing works in symbiosis with other types of digital marketing: It is a way to incorporate SEO search terms into fresh website content, and the content created can be shared as social media posts and in email marketing publications. Looking at the analytics for your content marketing can tell you a lot about your customers: what are they looking for when they land on your site? What kinds of content make them stay on the site longer and keep looking around? What kinds make them lose interest and navigate away?

Unlike a method such as PPC, content marketing is a long-term strategy. Over time, marketers build up a library of content (text, video, podcasts etc.) that will continue to bring users to the site via search engines, according to Marketo, a

marketing automation company. This content library also helps promote knowledge of your brand and increases your profile as a resource for information. And, if users are visiting your site for information, ideally they will remember you as an authority when it's time to make a purchase.

Content marketing is a great avenue for people who enjoy writing and/or video and audio production. But as with digital marketing in general, it also calls for strong strategic and analytic skills.

## Email Marketing

Even with the emergence of social media, mobile applications and other channels, email is still one of the most effective marketing techniques, Rogers said. It can be part of a content marketing strategy, providing value to consumers and over time convert an audience into customers. Email marketing pros not only know how to create compelling campaigns, they also understand optimal audience outreach and are skilled at analyzing customer interactions and data, and making strategic decisions based on that data, according to the American Marketing Association.

Email marketing software can offer many different analytical measures, but two that marketers are always striving to improve are the open rate –the percentage of recipients who opened the email – and the click through rate – the number of recipients who opened the email and clicked on a link in the email. According to leading email marketing software company Constant Contact, there are many things marketers can do to make their emails more appealing to users and more likely to be opened. These include:

- Create a Sense of Urgency – Writing email copy that lets your recipients know that time is running out to get a special deal or that there are only a limited number of the offer available, can increase the number of people clicking through to your website.
- Personalize Your Email – Setting your emails and subject lines up to incorporate the recipient's name is a proven way to increase open and click through rates. (A sample subject line: "Katie, a special offer just for you.")

- Let Recipients Set Their Preferences – Allowing users to specify how often they want to hear from you can help keep some of your email subscribers subscribed to your list and clicking on your emails.

## **Mobile Marketing**

This digital marketing type is focused on reaching your target audience on their smart phone or tablet. Mobile marketing reaches people through text messages, social media, websites, email and mobile applications. Marketers can tailor offers or special content to a geographic location or time, such as when a customer walks into a store or enters an event.

According to a recent TechCrunch article, consumers in the United States now spend five hours a day on their phones. This represents a 20% increase from the fourth quarter of 2015. Users are also spending much more of their time in apps rather than on mobile browsers. In 2017, users are spending much more time with apps than watching television. 15% of that app time is spent with entertainment apps like Netflix and Hulu, 19% of it is spent on Facebook's mobile app, 12% on other social and messaging apps, and 11% in gaming apps, according to the TechCrunch article.

Retail Dive reports that 45% of all shopping always or frequently involves a mobile device in some way, whether it's used to do research, compare prices or make a purchase. For a majority of Millennials (defined the Pew Research Center as people born between 1981 and 1997), that number is 57%.

Marketers know that you need to take your message to where your customers are, and in 2019 it is very clear: your potential customers are on their phones.

## **Marketing Analytics**

One of the major advantages of digital marketing is that it is highly trackable and measurable. Once, the only trackable marketing pieces were coupons and similar

direct mail offers. If a customer used the coupon, you knew the message resonated. Today, analytics allow marketers to track user behavior at a highly detailed level: how many times they click on a link, how much time they spend on a web page, how often they open emails, and much more. But the vast amount of information available about digital marketing performance can feel like drinking from a fire hose, and marketers must be able to truly understand what the data mean and how they should inform strategy.

Not only does this allow marketers to learn what is successful with consumers and adapt their marketing messages moving forward, it also means they can demonstrate their value to the company. Understanding all of this data and using it to make strategic decisions is an important part of a digital marketer's work, and one that sets them apart from their traditional counterparts.

There are many tools available for measuring the success of digital marketing campaigns, and many marketers will use some combination of these tools, depending on their needs and their audience (Fortune magazine reported that many marketers are using over 100 applications in their total marketing process.) One of the most used tools for marketing analytics is Google Analytics, which can be customized in nearly endless ways to measure how your site is performing, which keywords are bringing users to your site, how users are navigating through your website, and much more.

Having good, accurate analytics and the know-how to interpret them can help marketers “fail fast,” quickly cutting campaigns that aren’t working and building better campaigns around concepts that have a proven track record of success. Over time, you won’t just be using analytics to measure your campaigns – the analytics will also inform and improve your campaigns.

## **Ad Targeting**

Targeted advertising is a form of advertising, including online advertising, that is directed towards an audience with certain traits, based on the product or person the advertiser is promoting. ... Targeted advertising is focused on certain traits and consumers who are likely to have a strong preference.

## **Keyword Advertising**

Keyword advertising is a method of advertising on search engines using keyword research. By determining the keyword searches that are most relevant to your business's offerings, you can then bid to place your ads in the search results for relevant keywords. For example, if you sell footwear, you can make sure people searching for keywords like "sneakers" or "women's boots" see your advertisements.

Creating a successful PPC keyword advertising campaign is largely dependent on discovering these high-value keywords. WordStream offers keyword advertising software that can help you discover and utilize these top-notch keywords to optimize your online advertising campaigns.

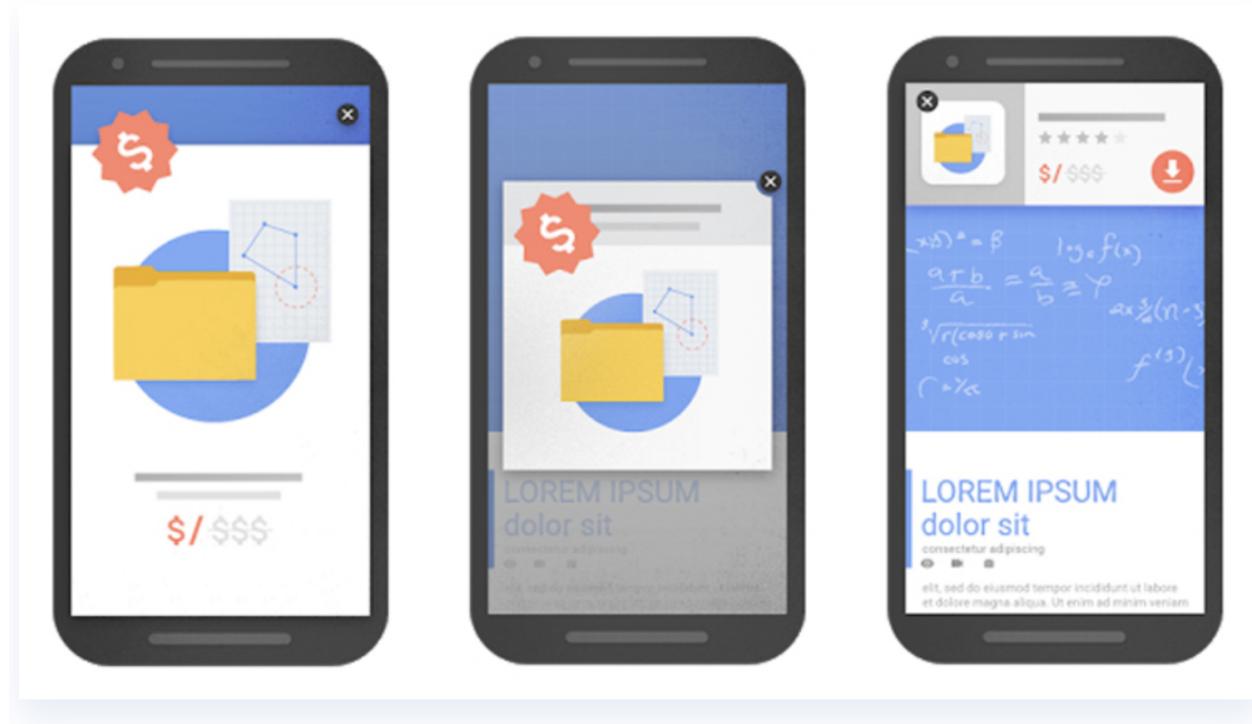
## Display Ad Marketing

Research!

## Interstitial Ad

Interstitial ads are interactive, full-screen ads that cover the interface of their host app or site. These ads appear between content, so they place at natural transition points or breaks, such as in between activities or game levels. Their full-coverage is what differentiates them from other ad types, like pop-up, native, and banner ads.

For reference, here's an interstitial ads example (left), compared to a pop-up ad (middle) and banner ad (right):



Ad types include text, image, rich media, and video. Users can navigate past any of these by clicking or tapping on the ad to visit its destination or closing it to continue what they were doing previously.

The timing of the close option depends on ad type. Non-video ads will have an immediate close option:

## **Penalties for mobile interstitial ads**

Google now penalizes mobile pages containing interstitials, simply because obstructing content on mobile with ads is against their guidelines.

On mobile devices (smaller screen), it's not always easy to find the 'X,' 'Close,' or 'Continue to site' link. Even when you see it, tapping it is difficult due to its size and placement. So while the desktop version is annoying, mobile interstitials can ruin the entire user experience.

As of November 1, 2015, Google's mobile-friendly test began excluding any mobile web page from the "mobile-friendly" category that showed an app install interstitial after clicking from the search result page. Then starting January 10, 2017, mobile pages where content is not easily user-accessible from the mobile search results may not rank as high.

## **Penalty Exceptions? Research**

### **What is an ad exchange?**

An ad exchange is a digital marketplace that enables advertisers and publishers to buy and sell advertising space, often through real-time auctions. They're most often used to sell display, video and mobile ad inventory.

### **Who buys from ad exchanges?**

Virtually anyone can buy from an ad exchange provided the ad exchange allows it. Advertisers and agencies typically use demand-side platforms or their own bidding technologies to do so, but ad networks and other entities also buy ads from exchanges.

## What is Programmatic Advertising

Effectively capturing the attention of consumers in today's digital ecosystem is no easy task, which is why we're going to talk about Programmatic Advertising today. There are millions of websites, applications and digital properties being viewed across a variety of channels, all day, everyday.

Having to use separate platforms to advertise on different channels and having to select the best places to put your advertisements in the digital world is an increasingly daunting task.

### **Programmatic advertising solves this.**

**Programmatic advertising is the automated buying and selling of online advertising.**

This automation makes transactions efficient and more effective, streamlining the process and consolidating your digital advertising efforts in one technology platform.

Programmatic platforms have been growing their inventory and database such that any format and any channel can be accessed programmatically today, including mobile, desktop, tablet, audio, digital outdoor and connected TV.

Targeting tactics are used to segment audiences using data so that advertisers only pay for ads delivered to the right people at the right time, and depend less on the “spray and pray” method of digital advertising. Computers and algorithms make the ad buying, placement and optimization process more efficient, remove mundane activities and cut down on time to market.

### *An Example of How Programmatic Advertising Works:*

*Advertiser Totally Tubular wants to sell more surfboards*

*It hires a programmatic advertising platform that is able to identify online consumers by things like:*

- *demographics (male / female / 18 – 45),*
- *geography (3 min from a beach),*
- *interests (surfing, saltwater, California),*
- *behaviours (consume surfing content on their lunch break),*
- *time of day (7-10PM)*
- *weather (sunny)*
- *device (smartphones)*

*The platform then uses real-time data to identify the best online audience(s) for the campaign and buys digital ad inventory through an auction based on everything available across multiple devices, in places the audience cares about.*

*Advertisements are personalized based on each consumers unique interests and behaviors.*

*Intelligent connections are made, insights are generated, and performance is optimized.*

*How do I run programmatic ads?*

1. Step #1 — Preparation. Set Your **Advertising** Campaign Goals. Choose the Type of **Programmatic Ad Campaign**. ...
2. Step #2 — Launch. Estimate Budget Of Your **Advertising** Campaign. Define Basic Targeting Options. ...
3. Step #3 — Optimization. Receive Real-Time Reports and Analyze Them. Optimize Settings According to Your Analysis.

*Real-Time Bidding, E-mail Marketing, Affiliate Marketing, Social Marketing, Mobile Marketing, Local Marketing, Online Marketing Metrics, Pricing Models for Online Advertisements, Case Studies: Facebook Marketing Tools, Twitter Marketing Tools, Pinterest Marketing Tools, Location Based Marketing Tools: Google AdSense*

## *Local Marketing*

*Local marketing is a strategy that targets potential customers within a specific radius – typically 50 miles – of the physical location of a business. It's also known as location-based marketing, neighborhood marketing, or local store marketing.*

*Local marketing can work for any brand that has a physical brick-and-mortar location, like shops and bars, or any locally-based businesses that travel to a customer's location, such as plumbers and electricians.*

*Local businesses can use a range of [outbound](#) and [inbound marketing](#) methods to attract customers, including:*

- **Inbound:** [Google My Business](#), Local SEO, social media marketing, etc.
- **Outbound:** [Display ads](#), attending local events, community involvement, etc.

## *Online Marketing Metrics*

**Digital Marketing Metrics and KPIs{Key Performance Indicator}** are values used by marketing teams to measure and track the performance of their marketing campaigns. Digital marketing teams use a number of tools to promote their services and products, and tracking the results can often be time consuming and difficult. By creating specific digital marketing KPIs, it's easy to determine targets and goals and measure performance based on those values.

*The top KPIs for modern digital marketers that are data-driven:*

- *Web traffic sources*
- *Brand awareness*
- *Cost per lead*
- *Website traffic leads*
- *Returning visitors*
- *Online conversion rates*
- *Lead conversion rates*
- *Click thru rate*
- *Customer lifetime value*

## *Pricing Models for Online Advertisements*

*Any of the following pricing models might be right for your digital advertising campaign.*

### **1. Cost-per-Thousand (CPM)**

*The cost-per-thousand (CPM) model is the most common pricing model for video advertising. Display advertising also commonly uses the CPM model, but display ads are starting to move towards other pricing models, such as cost-per-lead (CPL) or cost-per-action (CPA).*

*The CPM pricing model sets a flat rate for every 1000 views an ad gets. One of the major issues with this pricing model is that advertisers are charged regardless of whether anyone clicks their ad. Youtube, for example, bills advertisers on **a CPM basis**. Advertisers are charged a flat rate per thousand views that depend on a variety of factors.*

*What content is running alongside the ad? What format is the ad? How long is the ad? Is the ad skippable? Are there other advertisers bidding for that ad space?*

*Depending on the answer to those questions, advertising costs on Youtube can vary wildly. There is one main question advertisers need to ask themselves when considering a CPM digital advertising campaign. "Am I willing to pay for just impressions, no actions or clicks?" If not, you might want to consider another pricing model.*

## **2. Cost-per-Click (CPC)**

*Cost-per-click (CPC) advertising charges advertisers only when someone clicks on the ad. This model corrects one of the major issues with the CPM model, where advertisers are charged, regardless of how many people click on the ad. That doesn't mean the CPC model is perfect, in search advertising, keywords have become very expensive ([and prices are steadily rising](#)).*

*The most expensive keywords belong to industries such as finance, insurance, and professional services. For example, a single click on a search ad for the keyword, [Insurance](#), costs just under \$55, however, having targeted keywords to bid on will lower your cost per click substantially.*

*While CPC advertising guarantees clicks, there still are some issues other than expensive keywords. [ It doesn't guarantee clicks] You get charged for errant clicks that do not result in a lead or customer action, but the risk of paying for nothing is lower than it is for the CPM model. The CPC model is commonly used for [sponsored social media posts](#) and display ads on web pages.*

### **3. Cost-per-Lead (CPL)**

*Cost-per-lead (CPL) pricing models are the most advertiser-friendly pricing model. In the CPL model, advertisers only pay for every qualified lead. This model eliminates the possibility of paying for accidental clicks and views. To qualify as a lead, someone has to explicitly fill out a form on the advertiser's website after clicking the ad (usually to provide contact information.) CPL advertising allows advertisers to generate guaranteed returns from their online advertising budget.*

*In 2008, the Obama campaign used CPL advertising to build email lists. A lead was only considered qualified if they signed up for a eNewsletter, making the campaign very cost effective.*

*CPL models will increase the cost-per-lead depending on the complexity of the form that the user needs to fill out. The more qualified a lead is, the more expensive they will be. That usually means that the more information the form requires, the more expensive the lead will be.*

### **4. Cost-per-Action**

*The cost-per-action (CPA) model requires even more specific actions than CPL before an advertiser pays. Usually, that action involves the customer making a purchase or signing up for a service. In CPA advertising, the advertiser usually*

*only pays after a credit card transaction. That means the CPA model is best for motivating immediate action when the advertiser wants a customer to buy something right away. For that reason, CPA advertising can be ineffective for industries with a high barrier to purchase such as financial services, insurance, and professional services.*

*Some of the benefits of the CPA model is the fact that advertisers do not have to pay for bad leads, knowing that a transaction has been made every time they have to pay for the ad. The CPA model makes it easier for advertisers to choose their price point because it's easier to determine the value of a customer. All you need to do is calculate the revenue that customer will bring, and how much profit you want to make on each sale.*

*CPA advertising can also refer to cost-per-order (CPO), online lead generation or cost-per-conversion.*

*Assignment:*

*Case Studies: Facebook Marketing Tools, Twitter Marketing Tools, Pinterest Marketing Tools, Location Based Marketing Tools: Google AdSense*

*Search Engine Optimization, Working mechanism of Search Engines, On Page SEO, Off Page SEO, Page Ranks, Using Google Analytics, Social Media Analytics, Recommendation Systems: Collaborative, Content Based, Use of Recommendation Systems in E-commerce.*

*Search Engine Optimization*

## ***What is SEO?***

*SEO stands for “search engine optimization.” In simple terms, it means the process of improving your site to increase its visibility for relevant searches. The better visibility your pages have in search results, the more likely you are to garner attention and attract prospective and existing customers to your business.*

# **How does SEO work?**

*Search engines such as [Google](#) and [Bing](#) use bots to crawl pages on the web, going from site to site, collecting information about those pages and putting them in an index. Next, algorithms analyze pages in the index, taking into account hundreds of ranking factors or signals, to determine the order pages should appear in the search results for a given query.*

*Search ranking factors can be considered proxies for aspects of the user experience. Our [Periodic Table of SEO Factors](#) organizes the factors into six main categories and weights each based on its overall importance to SEO. For example, content quality and keyword research are key factors of content optimization, and crawlability and mobile-friendliness are important site architecture factors.*

*The search algorithms are designed to surface relevant, authoritative pages and provide users with an efficient search experience. Optimizing your site and content with these factors in mind can help your pages rank higher in the search results.*

*Unlike [paid search ads](#), you can't pay search engines to get higher organic search rankings.*

# *Why is SEO important for marketing?*

*SEO is a fundamental part of digital marketing because [people conduct trillions of searches](#) every year, often with commercial intent to find information about products and services. Search is often the primary source of digital traffic for brands and complements other marketing channels. Greater visibility and ranking higher in search results than your competition can have a material impact on your bottom line.*

*However, the search results have been [evolving over the past few years](#) to give users more direct answers and information that is more likely to keep users on the results page instead of driving them to other websites.*

*Also note, features like [rich results](#) and [Knowledge Panels](#) in the search results can increase visibility and provide users more information about your company directly in the results.*

# *What is On-Page SEO?*

*Think of the most basic search engine optimization tactics:*

- *Using keywords in your page title and page copy*
- *Optimizing the meta description to stand out in search engine results pages (SERPs)*
- *Using HTML code and alt tags*

*THAT'S the foundation for on-page SEO.*

*It's all the measures taken directly within your website to improve its position in search rankings by making it easy for search engine bots to interpret the page as well as give end-users a preview of what they're clicking through from the SERP. It also takes into consideration overall content quality, page performance, and content structure.*

## **ON-PAGE SEO FACTORS:**

### **Content**

*It's important to approach this with the mindset that "content is king." You can do all of the optimization around keywords, descriptions, and internal linking you want, but if the on-page content sucks, no one is going to visit your site.*

## **Keywords**

*While keywords are less important than they were a few years ago, [keyword optimization](#) is still a cornerstone of SEO today. That said, the focus has shifted towards more [long-tail keywords](#), which better fit the search patterns of today's internet users. Think of your audience and the keywords they're searching for; then create and optimize your website content around those keywords.*

## **Title Tag**

*The title tag refers to the title of a web page, or the main heading you see in the SERP{search engine result pages}, and is one of the most important on-page SEO factors after your actual on-page content. Keep this title to 65 characters or less (choose your words wisely!)*

## **Meta Description**

*A meta description is a short description that appears below the URL on a search engine results page and below a headline in a social post. It describes the content on that page but, more importantly, it's written to help your web page stand out in the list of SERP results. Keep the description to under 155 characters to ensure your entire description is shown in search results.*

## **Weidert Group: Inbound Marketing for Complex Industries**

Weidert Group is a Wisconsin-based B2B inbound marketing agency helping clients in complex industries generate and close leads online.

## **Alt Text**

*Alt text refers to the word or phrase that can be attributed to a picture file to help ensure it gets indexed and so search engines understand what it is since they can't see images (they only see text). For example, if you use a graphic in your blog that outlines some injection molding tips, you can save the alt text for that image as "automotive-injection-molding-tips," and that graphic will start to rank for that phrase in the image results.*

## **SSL/HTTPS**



*Page security is more important than ever, and enabling Secure Sockets Layer (SSL) security technology is crucial for improving your security, trustworthiness, and visibility. By enabling SSL, you increase the likelihood that a third party doesn't come between your web server and the visitors' web server, ensuring that information entered on the site is safe. Likewise, Google actually prefers sites that are SSL-enabled, making it essential to boosting visibility.*

## **URL Structure**

*In addition to the factors listed above, an organized URL structure is important for today's marketers because it allows search engines to crawl from page-to-page on your website easily and makes navigation more efficient for visitors. URLs should contain keywords that reflect the pages they direct to, as easy-to-understand URLs are more likely to earn clicks and help search engines crawl your site. URLs should also be*

*relatively short, using your primary keyword for that page and not using redundant words.*

*This is where [pillar pages](#) have come into play more recently for marketers, with certain website pages being dedicated to popular topics your prospects are searching for and also linking all related pages back to that pillar. Let's say you want to create pillar pages dedicated to automotive, medical, and consumer injection molding applications. With your pillars identified, you can tailor your content and URL strategy specifically to those pillars, link all related content back to the main pillar page, and help you boost your searchability on those topics.*

### ***Internal Linking***

*Speaking of linking, internally linking related pages on your website is another important factor of on-page SEO. Linking to different relevant pages on your site makes it easier for search engines to crawl everything, and it also keeps visitors engaged longer.*

### ***Breadcrumb Navigation***

*Breadcrumbs are navigational aids that inform website visitors where they are on your site and also help Google understand the structure of your website. A small text path typically located at the top of a page, a breadcrumb indicates where the user is, with every step being clickable. Breadcrumbs appear in Google search results, giving users a simple overview of where the page is located on your site.*

*The three different types of breadcrumbs:*

- *Hierarchy-Based — shows how many steps gets you back to the Home Page  
Home > Blog > Industry > Title of Post*
- *History-Based — ordered by where a visitor has been doing on the site  
Home > Name of Previous Page > Name of Previous Page > Current Page*

- *Attribute-Based — most common on e-commerce sites; shows product attributes*  
*Home > Product Area > Style > Material > Size*

## **Page Performance**

*While other factors of on-page SEO deal with content quality and structure, the performance of your website (and its pages) also are on-page ranking factors. Pages that take a long time to load or don't render properly on mobile rank lower in SERPs, as users get frustrated, leave, and increase the bounce rate.*

*Search engines evaluate this and use it as a key page ranking factor, so it's crucial for marketers to consider the image file sizes on their pages, reduce redirects, improve the mobile responsiveness of their site, and minimize the amount of CSS/Javascript.*

## **Mobile Friendliness**

*Everyone has smartphones, and the search for information seems constant. Yes, mobile has changed the world, so a mobile-friendly website is a critical part of your online presence.*

*There are two big reasons to make sure visitors with mobile devices have a good experience on your site:*

1. *Non-mobile-friendly sites force visitors to pinch or zoom just to read content, which is frustrating and could cause them to abandon your site*
2. *Because all of Google now uses the mobile version of website pages for SEO*

## **Schema Markup**

*Schema markup is used by Google to get information for [SERP snippets](#). There are many kinds of Schema Markup, some pertaining to a target persona more than others:*

- *Business Events*
- *Search Results*
- *FAQ Page*
- *News Articles*
- *Business Function*
- *Job Posting*
- *Local Business*

### **Core Web Vitals**

*Launched in spring of 2020, Google's Core Web Vitals helps determine a website's page performance as well as user experience. It helps quantify the experience of a site and identify opportunities to improve.*

*Each Core Web Vitals represents a unique part of the user experience and reflects the real-world experience of a visitor. Currently, the set covers three aspects of the user experience: loading, interactivity, and visual stability.*

## **What is Off-Page SEO?**

*While on-page SEO refers to the factors you can control on your own website, off-page SEO refers to the page ranking factors that occur off your website, such as backlinks from another site. It also includes your promotion methods, taking into account the amount of exposure something gets on social media, for example.*

### **OFF-PAGE SEO FACTORS:**

*Backlinks*

*The number and quality of backlinks you have to your site is undoubtedly the biggest factor of off-page SEO. The more sites linking to your content, the more domain authority Google grants your site, boosting your ranking. This has led marketers to try questionable paid link-building tactics, but there are several organic approaches you can take that produce effective results, such as:*

- *Guest blogging*
- *Being featured in industry trade publications*
- *Seeking out contacts in the industry who'd be happy to share your content*
- *Guesting on a podcast*
- *Participating in an industry community such as a forum*
- *Hosting events (in person or virtual).*
- [\*Help A Reporter Out \[HARO\]\*](#)
- *Press Releases*

*The backlink anchor text is very important, too. It's why most companies have no trouble ranking for their brand name. Most anchor text will contain their name. When you want to rank for a specific keyword you really want that anchor text to contain the keyword.*

### *Domain Authority*

*Measured on a scale from 1-100, your domain authority is a number given to you by search engines to determine the strength of your website. Think of it as a grade, essentially. Websites with a higher domain authority receive preference in the search results, while websites with a lower domain authority are more likely to rank near the bottom.*

*Domain authority is measured by a few different factors, including how long you've had your domain name (the longer the better), the history of the domain name, the number*

of backlinks, and the number of 404 pages. By ensuring you have a technically sound website that follows the [SEO best practices](#), you can maximize your domain authority and improve your ranking.

### *Social Promotion*

While page ranking isn't tied directly to the interactions on a social media post, social posts that generate a lot of clicks will certainly help boost traffic to the site and generate a ton of link shares.

### *Local SEO*

Online reviews on sites like [Google My Business](#), Yelp, and other review sites help boost local SEO because they revolve around where you are. For instance, looking for IT services in your area brings up local listings. There's no point in showing you an IT management company if they don't service your area. Also consider NAP (Name, Address, Phone) citations.

### *PPC (Google, Twitter, Facebook, LinkedIn)*

I am sure you're thinking, "This is supposed to be about SEO!" Well, SEO is part of a good [pay-per-click \(PPC\) campaign](#) and vice versa. When your site is still getting off the ground, you need to get visitors, and PPC can help with that. If you have good content that you're promoting with PPC, it generates more traffic to your site, resulting in more backlinks to your site and other forms of ranking factors.

On-page and off-page SEO work together to improve search engine rankings. By working on what you can control today — producing quality content that's supported by high-quality on-page SEO — you'll be well on your way to earning backlinks, improving your domain authority, and controlling your off-page SEO.

*Ready to learn more about SEO? Check out our comprehensive SEO survival guide and download a copy to reference every time you publish website or blog content.*