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**«*Electronic business and electronic  
commerce*»**

(supporting lecture notes for students of  
"Management" direction)

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## INTRODUCTION

The term "*e-Business*" therefore refers to the integration, within the company, of tools based on information and communication technologies (generally referred to as business software) to improve their functioning in order to create value for the enterprise, its clients, and its partners.

E-Business no longer only applies to virtual companies (called *click and mortar*) all of whose activities are based on the Net, but also to traditional companies (called *brick and mortar*).

The term *e-Commerce* (also called *Electronic commerce*), which is frequently mixed up with the term *e-Business*, as a matter of fact, only covers one aspect of e-Business, i.e. the use of an electronic support for the commercial relationship between a company and individuals.

The purpose of this document is to present the different underlying "technologies" (in reality, organizational modes based on information and communication technologies) and their associated acronyms.

E-Business systems naturally have greater security risks than traditional business systems, therefore it is important for e-business systems to be fully protected against these risks. Customers, suppliers, employees, and numerous other people use any particular e-business system daily and expect their confidential information to stay secure. Hackers are one of the great threats to the security of e-businesses. Some common security concerns for e-Businesses include keeping business and customer information private and confidential, authenticity of data, and data integrity. Some of the methods of protecting e-business security and keeping information secure include

physical security measures as well as data storage, data transmission, anti-virus software, firewalls, and encryption to list a few.

## **TOPIC 1. BASIC CONCEPTS OF ELECTRONIC BUSINESS AND ELECTRONIC COMMERCE**

*1.1. Basic concepts and principles of e-business.*

*1.2. Origins and growth of e-commerce.*

### ***1.1. Basic concepts and principles of e-business.***

Electronic commerce, in a broad sense, is the use of computer networks to improve organizational performance. Increasing profitability, gaining market share, improving customer service, and delivering products faster are some of the organizational performance gains possible with electronic commerce. Electronic commerce is more than ordering goods from an on-line catalog. It involves all aspects of an organization's electronic interactions with its stakeholders, the people who determine the future of the organization. Each of these components of our working definition of e-commerce is important. Digitally enabled transactions include all transactions mediated by digital technology. 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.

There is a debate among consultants and academics about the meaning and limitations of both e-commerce and e-business. Some argue that e-commerce encompasses the entire world of electronically based organizational activities that support a firm's market exchanges – including a firm's entire

information system's infrastructure. Others argue, on the other hand, that e-business encompasses the entire world of internal and external electronically based activities, including e-commerce.

We think that it is important to make a working distinction between e-commerce and e-business because we believe they refer to different phenomena. For purposes of this text, we will use the term e-business to refer primarily to the digital enablement of transactions and processes within a firm, involving information systems under the control of the firm.

There are three components of digital economy:

- E-commerce;
- IT infrastructure;
- E-business infrastructure.

*E-business* is a kind of economic activities of companies by the help of computer networks, in particular, Internet, with the aim of making profit. This is e-business activity, which is carried out by means of information and communication technologies with the aim of making profit.

E-commerce is one of the ways to implement e-business.

*Electronic commerce* (e-commerce) is a kind of electronic business with the using of information communication technologies.

E-commerce provides:

- opening of Web-sites and virtual shops in the Internet;
- availability of automated management company system;
- the use of electronic advertising and marketing;
- the use of certain model of business cooperation.

The term "e-commerce" is broader than Internet commerce because it includes all kinds of commercial activities carried out electronically.

*Internet commerce* is e-commerce, limited by only Internet using.

Internet commerce does not include: commercial activity using VAN (virtual area network is a network on which users are enabled to share a more visual sense of community through high band-width connections, example: remote medical diagnosis and legal consultation, and online corporate or extracorporate workgroups, focus groups, and conferences) networks, mobile commerce, enterprise resource management system (MPR, ERP, CSRP).

For the most part 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 (see Mesenbourg, U.S. Department of Commerce, August 2001 for a similar view).

E-business is based on such important technologies:

- network technologies;
- corporate technologies;
- Internet technologies;
- industrial IT;
- decision support system.

You can consider the following types of electronic economic activity:

- virtual company;

- electronic wholesale and retail trade;
- pre- and after-sales support for consumers,
- electronic wholesale and retail financial services, including loans and insurance;
- commercial marketing research types;
- electronic advertising;
- commercial transactions (interactive electronic ordering, delivery, payment);
- the general development of the product (goods and services);
- distributed co-production of electronic products;
- electronic business administration (including the scope of the tax administration);
- electronic accounting;
- agreements in electronic form;
- electronic administration of arbitration (dispute resolution), etc.

The reasons for which companies are moving into electronic space:

- acquirement of new market segments;
- increasing of response;
- new services providing;
- costs reduce;
- on-line support of business processes;
- partnership;
- day and night access.

## *Features of e-commerce technology*

E-commerce has challenged much of this traditional business thinking. Features of e-commerce technology that both challenge traditional business thinking and explain why we have so much interest in e-commerce:

*Ubiquity.* In traditional commerce, a marketplace is a physical place you visit in order to transact. For example, television and radio typically motivate the consumer to go some-place to make a purchase. E-commerce, in contrast, is characterized by its ubiquity: it is available just about everywhere, at all times. It liberates the market from being restricted to a physical space and makes it 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 point of view, 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. At a broader level, the ubiquity of e-commerce lowers the cognitive energy required to transact in a market space. Cognitive energy refers to the mental effort required to complete a task. Humans generally seek to reduce cognitive energy outlays. When given a choice, humans will choose the path requiring the least effort – the most convenient path.

*Global Reach* technology permits commercial transactions to cross cultural and national boundaries far more conveniently and cost-effectively than is true in traditional commerce. As a result, the potential market size for e-commerce merchants is roughly equal to the size of the world's online population (over 1 billion in 2005, and growing rapidly, according to the Computer Industry Almanac) (Computer Industry Almanac, Inc., 2006). The total number of users or customers an e-commerce business can obtain is a

measure of its reach. In contrast, most traditional commerce is local or regional – it involves local merchants or national merchants with local outlets. Television and radio stations, and newspapers, for instance, are primarily local and regional institutions with limited but powerful national networks that can attract a national audience. In contrast to e-commerce technology, these older commerce technologies do not easily cross national boundaries to a global audience.

*Information richness* refers to the complexity and content of a message. Traditional markets, national sales forces, and small retail stores have great richness: they are able to provide personal, face-to-face service using aural and visual cues when making a sale. The richness of traditional markets makes them a powerful selling or commercial environment. Prior to the development of the Web, there was a trade-off between richness and reach: the larger the audience reached, the less rich the message.

*Interactivity.* Unlike any of the commercial technologies of the twentieth century, with the possible exception of the telephone, e-commerce technologies allow for interactivity, meaning they enable two-way communication between merchant and consumer. Television, for instance, cannot ask viewers any questions or enter into conversations with them, and it cannot request that 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 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 information available to all market participants, consumers, and merchants alike. E-commerce technologies reduce information collection, storage, processing, and

communication costs. A number of business consequences result from the growth in information density.

*Personalization/Customization.* E-commerce technologies permit personalization: merchants can target their marketing messages to specific individuals by adjusting the message to a person's name, interests, and past purchases. The technology also permits customization – changing the delivered product or service based on a user's preferences or prior behavior. Given the interactive nature of e-commerce technology, much information about the consumer can be gathered in the marketplace at the moment of purchase. With the increase in information density, a great deal of information about the consumer's past purchases and behavior can be stored and used by online merchants.

### *Types of e-commerce*

The most important component of e-business is e-commerce, which includes not only the purchase and sale, and support of processes and creation of demand for products and services, automating administrative functions associated with online sales and processing of orders, as well as improving information exchange between partners.

For the most part, we distinguish different types of e-commerce by the nature of the market relationship – who is selling to whom.

*Business-to-Consumer (B2C) E-commerce.* The most commonly discussed type of e-commerce is Business-to-Consumer (B2C) e-commerce, in which online businesses attempt to reach individual consumers. There are seven B2C business models: portals, online retailers, content providers, transaction brokers, market creators, service providers, and community providers.

***Business-to-Business (B2B) E-commerce.*** Business-to-Business (B2B) e-commerce, in which businesses focus on selling to other businesses, is the largest form of e-commerce.

There are two primary business models used within the B2B arena: Net marketplaces, which include e-distributors, e-procurement companies, exchanges and industry consortia, and private industrial networks, which include single firm networks and industry-wide networks.

***Consumer-to-Consumer (C2C) E-commerce*** provides a way for consumers to sell to each other, with the help of an online market maker such as the auction site eBay.

***Peer-to-Peer (P2P) E-commerce*** enables Internet users to share files and computer resources directly without having to go through a central

***Mobile commerce***, or m-commerce, refers to the use of wireless digital devices to enable transactions on the Web. M-commerce involves the use of wireless networks to connect cell phones, handheld devices such as Blackberries, and personal computers to the Web. Once connected, mobile consumers can conduct transactions, including stock trades, in-store price comparisons, banking, travel reservations, and more. Thus far, m-commerce is used most widely in Japan and Europe (especially in Scandinavia), where cell phones are more prevalent than in the United States; however, as discussed in the next section, m-commerce is expected to grow rapidly in the United States over the next five years.

## ***1.2. Origins and growth of e-commerce.***

The early years of e-commerce were one of the most euphoric of times in American commercial history. It was also a time when key e-commerce

concepts were developed and explored. Thousands of dot.com companies were formed, backed by over \$125 billion in financial capital – one of the largest outpourings of venture capital in United States history.

For computer scientists and information technologists, the early success of e-commerce was a powerful vindication of a set of information technologies that had developed over a period of forty years – extending from the development of the early Internet to the PC, to local area networks.

A network effect occurs where all participants receive value from the fact that everyone else uses the same tool or product (for example, a common operating system, telephone system, or software application such as instant messaging), all of which increase in value as more people adopt them. Overall, this period of e-commerce was characterized by experimentation, capitalization, and hypercompetition.

The crash in stock market values for e-commerce throughout 2000 is a convenient marker for ending the early period in the development of e-commerce. Looking back at the first years of e-commerce, it is apparent that e-commerce has been, for the most part, a stunning technological success as the Internet and the Web ramped up from a few thousand to billions of e-commerce transactions per year, generating \$140–\$170 billion in B2C revenues and around \$1.5 trillion in B2B revenues in 2005, with around 110 million online buyers in the United States, and another 100 million worldwide.

If anything, e-commerce has created many new opportunities for middlemen to aggregate content, products, and services into portals and search engines and thereby introduce themselves as the “new” intermediaries. Yahoo, MSN, Google, and Amazon, along with third-party travel sites such as Expedia, are all examples of this kind of new intermediary.

The visions of many entrepreneurs and venture capitalists for e-commerce have not materialized exactly as predicted. First-mover advantage appears to have succeeded only for a very small group of sites. Historically, first movers have been long-term losers, with the early-to-market innovators usually being displaced by established “fast follower” firms with the financial, marketing, legal, and production complimentary assets needed to develop mature markets, and this has proved true for e-commerce as well. A number of e-commerce first movers, such as eToys.com, FogDog.com (sporting goods), WebVan.com (groceries) and Eve.com (beauty products) are out of business.

Customer acquisition and retention costs during the early years of e-commerce were extraordinarily high, with some firms, such as E\*Trade and other financial service firms paying up to \$400 to acquire a new customer. In 2004, certain law firms engaged in asbestos and tobacco liability suits were paying \$90 each time someone clicked on their Google ad. The overall costs of doing business on the Web – including the costs of technology, site design and maintenance, and warehouses for fulfillment – are no lower than the costs faced by the most efficient traditional stores. A large warehouse costs tens of millions of dollars regardless of a firm’s Web presence. The knowledge of how to run the warehouse is priceless, and not easily moved. The start-up costs can be staggering, as Amazon discovered. Attempting to achieve profitability by raising prices has often led to large customer defections. Table 1.5 summarizes some of the most important differences between today’s e-commerce and the early period.

There are such benefits from functioning of e-business and e-commerce:

1. E-business and e-commerce offer access to global markets. The company can expand its customer base and range of products.

2. Allows to improve business contacts. Sellers of industrial goods can establish closer links with buyers (eg markets "business to business" - B2B).

3. Availability of information about products and services for sale online in real time. Allows customers to get samples of products in quickly, easily and free way.

4. Allows to reduce costs. Providing transactions electronically reduces the cost of service operations, and this in turn results in lower prices for consumers.

5. E-commerce allows suppliers to improve competitiveness, becoming closer to the customer.

6. Reduces the amount of media required to store data.

7. Reduces time-to-market for product and process of adapting to changes in the market.

8. The emergence of new business models. New business models - virtual enterprise, virtual agents, technology outsourcing and telecommuting significantly improve the efficiency of business. In addition to converting existing market goods and services, e-commerce opens up the possibility of completely new products and services. For example: insurance, brokerage services and electronic delivery of support.

9. Increases the level of consumers commitment to the brand. Quality of service in the Internet is constantly improving, consumers can get new information about the company and products at any convenient time.

10. Specific advantages for management Internet provides for companies with remote branches or employees who need to travel frequently. With a modem and a computer company employees always have reliable communications with headquarters, access to corporate databases and can

quickly take advantage of the necessary information or consult leading experts of the company.

If a company is large and has many structural units, the adjustment of their collaboration is a difficult management task. And it is difficult to overestimate the importance of local area network company (institution), which is based on Internet-technology.

Despite obvious benefits there are obvious disadvantages in the e-business and e-commerce. They are:

- Internet can destroy the institution of resellers;
- competition moves from the local to the global level;
- problems of copyright protection;
- law uncertainty. Legal framework is not developed for Internet that would operate on a planetary scale.
- commitment reduction of consumers. Because there`s no personal contact in Internet, level of customer loyalty is not stable.
- lack of touch or feel of products during online shopping.
- initial cost: The cost of creating / building E-Commerce application in-house may be very high. There could be delay in launching the E-Commerce application due to mistakes, lack of experience.
- the problem of pricing. It is very easy to compare prices in Internet, that`s why they tend to decrease, but the role of additional services increases.
- information security while browsing the Internet.
- the issue of transparency. A means of user identification can control people, check their activities (unique identification code of the person may be subject of threats for humans).
- viability. Many businesses don`t have confidence that their e-business will be viable.

- uncovered is a segment of the population that has no access to the Internet. Internet access is still not cheaper and is inconvenient to use for many potential customers like one living in remote villages.

The consequences of attacks on information leading to economic losses:

1. Disclosure of commercial information may cause serious direct damages of the market.

2. News about theft of large amounts of information can seriously affect the reputation of the company, leading to losses in trading.

3. Competing firms can use stolen information, if the theft remained unnoticed, in order to bring the company into bankruptcy, forcing her fictitious or knowingly unprofitable agreements.

4. The substitution of information both at the transmission and preservation stage can lead to huge losses.

5. Reusable successful attacks on a firm providing any kind of information services, reduce customer`s trust to company, which affect the amount of profits.

Naturally, cyber attacks can cause enormous moral damage. The concept of confidentiality of communication is of great importance. Unfortunately, the need for a systematic approach for secure information technology has not yet gained a proper users understanding. Today experts from various disciplines somehow have to deal with the provision of information security. This is because we live in information technology society (environment) that affects all mankind social issues, including safety issues.

## TOPIC 2. ECOMMERCE AS A PART OF ELECTRONIC BUSINESS

2.1. E-business infrastructure, e-environment and e-business strategy

2.2. Ways of e-business conducting. Online trading.

### *2.1. E-business infrastructure, e-environment and e-business strategy*

*E-commerce* - a technology that provides complete closed cycle business operations, which includes ordering goods/services, conducting payments with the use of digital technology.

In general, "e-commerce systems" provide certain Internet technology which offers to participants of the system following capabilities:

- for manufacturers and suppliers of goods and services of different categories - to introduce in Internet goods and services (including online services and access to information resources), to handle and take over the Internet customer`s orders;

- for buyers (customers) - browse through standard Internet browsers catalogs and price lists.

Among the functionalities implemented through e-commerce systems we can list the following ones:

- ordering from catalogs and price lists (orders are stored in a single database);

- Internet connection applications to the internal management system;

- users self-registration;

- the possibility of online sales of goods of various categories;

- orders processing orders by standard scheme (registration, procurement, reporting and financial documents);

- realization of on-line payments.

Any form of commercial transactions can be the subject of e-commerce, for example trade, distribution agreements, commercial representation and agents relationships, factoring, leasing, industrial construction, consultancy services, engineering, licenses purchase/sale, investment, banking, insurance and other forms of industrial or business cooperation. All processes that make up the content of an agreement, such as market research, search of a commercial partner, payment transactions, risk insurance and others are subjects of e-commerce.

Electronic commerce is built on top of a number of different technologies. These various technologies created a layered, integrated infrastructure that permits the development and deployment of electronic commerce applications. Each layer is founded on the layer below it and cannot function without it.

E-business strategy can be considered as a main part of the corporate strategy. E-business strategy has always been the fundamental element of a successful company. The managers very often forget that wrongly made analyses can evoke problems which often lead to the increase of investments, to new analyses or system re-engineering. High percentage of the small and medium sized companies underestimated, or still underestimates the sense of e-business strategy development. The reason is an effort to reduce the input cost. Research results show that the reduction of money dedicated to detailed analyses in terms of the e-business strategy development, results in profit reduction after prospectus realization.

As a prerequisite to building an effective e-business strategy, managers should identify measurable business objectives, define costs and impact, align IT architecture and identify value propositions. These issues are common

starting points. In more detail, e-business strategy should contain analyses referred to:

- firm structure,
- firm produce and business activities,
- target group,
- competition,
- return of investments,
- information system,
- technology support,
- staffing,
- system of security,
- system of operation,
- management system,
- global environment.

Successful e-business strategies depend on the strength and flexibility of the underlying infrastructure, to support the e-business as a whole, not just part of it.

*e-Business infrastructure* - the collection of platforms, networks, products, applications, and databases and the business rules governing the flow of data and work among them, both internally and to external systems.

E-commerce can be provided by various electronic devices, in this regard, it is divided into the following types:

M-commerce (Mobile commerce) - commerce using mobile services.

T-commerce (Television commerce) - commerce using interactive digital television.

V-commerce (Voice commerce) - automated Internet transaction, carried out through voice portals using a computer or phone with voice commands. Voice portals such as brokerage system, can control home devices through the Internet.

U-commerce (universal commerce) – these are the possibilities to implement commercial activities by the help of electronic device at any time.

D-commerce (dynamical commerce) - dynamic pricing, which allows retailers to achieve highest transparency of operations and conduct electronic transactions on the most favorable terms.

### *Traditional commerce vs. E-commerce*

Due to the increased popularity and availability of Internet access many traditional small business are considering e-Commerce as a valid and profitable sales channel. However, e-Commerce and traditional commerce are very different, and it's important to weight carefully the differences between e-Commerce and traditional commerce in order to decide if it would be a good fit for your business or just a costly mistake.

*Direct Interaction.* Traditional commerce is often based around face to face interaction. The customer has a chance to ask questions and the sales staff can work with them to ensure a satisfactory transaction. Often this gives sales staff an opportunity for upselling, or encourage the client to buy a more expensive item or related items, increasing the shop profits. On the other hand, e-Commerce doesn't offer this benefit unless features such as related items or live chats are implemented.

*Lower Costs.* E-Commerce is usually much cheaper than maintaining a physical store in an equally popular location. Compared with costs such as commercial space rent, opening an online store can be done at a fraction of the price for less than \$50 per month. This can prove invaluable for small

business owners who don't have the startup capital to rent prime retail space and staff it to be able to sell their goods.

*Reach.* With an online shop you can do business with anybody living on a country you are able and willing to send mail to, unlike traditional commerce where you are restricted to people who actually come to your shop. This also opens the door to many other forms of marketing that can be done entirely online, which often results in a much larger volume of sales and even foot traffic to the store. An online store has no capability limits, and you can have as many clients as your stock can serve.

*Returns Rate.* In a traditional store, the customer will be purchasing the product in person, which has some benefits for both the him and the store. The customer will be able to touch and check the items, to make sure they are suitable, and even try them on, which reduces the number of returned items or complaints due to an item not being as advertised on a catalogue. or promotional leaflet. Expect a significantly higher rate of returns if you start trading online, as many will just order and try the items at home, and won't hesitate to return them as they can do it by post without having to talk with anybody in person.

*Credit Card Fraud.* The remote nature of E-commerce makes much more difficult to detect fraud, which means stores can lose money due to fraud. While traditional commerce is not totally secure, it's easier for a sales attendant to verify that the person buying something is actually the owner of the credit card, by asking for photographic ID. However, the fight against card fraud is well underway and banks and responsible eCommerce owners work together to verify that all card use is legitimate.

Selling online means learning new ways of dealing with customers, marketing your products and fulfilling your orders, but the benefits are great.

You can keep your costs lower, reach a wider audience and do business 24/7, having time to focus on improving your products and services and your customer experience instead of being on the store floor waiting for clients. Some products sell better online than others: selling jewelry for cash online is much easier than trying to sell houses or cars. However, having an online store can increase the customers on your traditional commerce as well, as people are now able to find you online and see what products you are offering.

Thus due to the exponential growth of Internet, nature and structure of competition intraditional way of doing business and e-commerce has been changed dramatically. In traditional way of doing commerce, most businesses had to compete within a single industry and often within a specific limited geographical area, but the Internet is breaking all these boundaries. Example: Amazon.com. The company began as an online bookstore but quickly expanded into new products and markets such as music, videos, home improvement supplies.

The traditional commerce is based on the following rules.

- It needs to hire sales executive, sales managers, accountants, and other staffs.
- Operates at business hours within a certain period of time.
- Requires location renting/purchasing, staff employment, advertising, inventory shipping and handling all sums up the high-cost equation which makes many people negate from starting a business entirely.
- No sharing of the information with the competitors.
- The basis of a traditional business depends on the frequency of new and old customers buying from them to keep the business running.

In today's fast-paced world, in order to stay in contention and thrive in the business world, it is very important to break through these conventional rules and adapt the information technology ways of doing business.

E-Commerce has important phases explained below:

- It is related with advertising of the products electronically and enabling the customers to browse through the available offers.

- It involves an agreement between the involved parties to continue with the succeeding phases.

- Order is made for the goods after an agreement is concluded

- E-payment systems on the Internet are used for receiving payments.

Goods are delivered to the customers. If it is a tangible product, it is sent by transportation. The main points of difference between traditional commerce and E-commerce are as follows:

- In E-commerce:

- Everything is digital.

- Less overhead costs

- Elimination of the middleman (disintermediation)

- Financial transactions on the Internet can actually be more secure than in traditional retail environments.

- Speed.

- Empowerment.

- Personalization.

- In Traditional Commerce:

- Heavy dependency on information exchange from person to person.

- Requires location renting/purchasing, staff employment, advertising, inventoryshipping and handling all sums up the high-cost equation which makes many people negate from starting a business entirely.

- It is difficult to establish and maintain standard practices in traditional commerce.
- Communications of business depends upon individual skills.
- Operates at business hours within a certain period of time.

## ***2.2. Ways of e-business conducting. Online trading.***

There are a variety of different kinds of e-commerce and many different ways to characterize these types. We can identify different types of business model that can be facilitated by the web. These are described mainly in terms of their revenue models and value chain or marketplace positioning.

***E-shop*** – marketing of a company or shop via the web;

***E-procurement*** – electronic tendering and procurement of goods and services. An e-procurement site is an online intermediary that offers businesses access to hundreds of parts and services provided by suppliers. E-procurement systems come in several variations, each with its own specialized capabilities.

***E-malls*** – Web-site that contains a significant amount of electronic stores and catalogs, united by a common location (in some cases - under a known brand), which together perform additional functions.

***E-auctions*** is a service in which auction users or participants sell or bid for products or services via the Internet. An online auction is also known as a virtual auction. Virtual auctions facilitate online activities between buyers and sellers in different locations or geographical areas. Various auction sites provide users with platforms powered by different types of auction software.

Online auctions are a widely accepted business model for the following reasons:

- No fixed time constraint
- Flexible time limits

- No geographical limitations
- Offers highly intensive social interactions
- Includes a large numbers of sellers and bidders, which encourages a high-volume online business.

The online auction business model continues to evolve according to market needs. Like other online services and activities, online auctions can attract stolen or pirated products.

The two major types of electronic auction are forward auction in which several buyers bid for one seller's goods and reverse auction in which several sellers bid for one buyer's order.

Forward auctions take the form of a single seller offering an item for sale, with buyers competing to secure the item by bidding the price upward. Forward auctions are far-better understood by the public at large than reverse auctions as to how they operate, due primarily to the fact that they are widely used at the consumer level. In fact, forward auctions underlie everything from eBay and other online auction sites to auctions of art, wine, and other collectibles. They are also widely used for auctioning everything from autos, real estate, machinery, etc., where the goal is for the seller to receive the most money possible for the item being offered at auction. Thus, a forward auction should be utilized for sales of goods and services of all types, whether conducted online, offline, or a hybrid of the two.

Reverse auctions are the other major form of auctions. In a reverse auction, a single buyer makes potential sellers aware of their intent to buy a specified good or service. During the course of the actual reverse auction event, the sellers bid against one another to secure the buyer's business, driving the price to be paid for the item downward. Thus, the winning bidder is the seller who offers the lowest price. Reverse auctions are most typically

used for procurement by private companies, public sector agencies, and non-profit organizations.

*Reverse Auctions and Tendering Systems.* In a reverse auction, buyers list the items they wish to purchase, and sellers bid to provide those items at the lowest price. Sites of this sort provide the following capabilities:

- Catalog of items to be tendered and their content management
- Search engine (if the site has many items)
- Personalized pages for potential large bidders
- Reverse auction mechanisms, sometimes in real time
- Facility to help prepare, issue, manage, and respond to a buyer's request for quotes (RFQs)
- Ability to bid dynamically
- Automatic vendor approval and workflow (e.g., SmartMatch's supplier identification technology)
- Electronic collaboration with trading partners
- Standardization of RFQ writing
- Site map
- Mechanism for selecting suppliers
- Automatic matching of suppliers with RFQs
- Automatic business process workflow
- Ability for bidders to use m-commerce for bidding
- Automated language translation

*Forward Auctions* enable selling companies to post items they want to sell, and buying companies to compete for the best prices acceptable to the selling companies for those items. In forward auctions, winning bidders (buyers) are obligated to buy items.

A typical forward auction consists of the following steps:

- Both the seller and the buyer complete the online registration process, including providing shipping points and regulatory and banking information.
- The seller starts an auction by listing the product, the asking price, and the quantity on a form.
- The buyer chooses a bid product and indicates a bid price and quantity. The buyer may also set the maximum price and bid increments.
- Sophisticated software determines the auction winner, based on price, volume, and timing.
- A funds transfer from the bidder takes place immediately.
- Upon successful funds transfer, a freight company is dispatched to the seller's location; the product is loaded and delivered to buyer's location.
- The buyer inspects and accepts the product.

Funds are released to the seller. The capabilities of forward auctions can be best viewed at [ebay.com](http://ebay.com).

***Virtual communities*** – these can be B2C communities such as the major social networks or B2B communities such as built around trade publishers;

***Collaboration platforms*** – these enable collaboration between businesses or individuals, e.g. E-groups, now part of Yahoo! ([www.yahoo.com](http://www.yahoo.com)) services;

***Value-chain integrators*** – offer a range of services across the value chain;

***Value-chain service providers*** – specialize in providing functions for a specific part of the value chain, such as the logistics company UPS ([www.ups.com](http://www.ups.com));

***Brokerage information providers*** – provide information for consumers and businesses, often assist in making the buying decision or for business operations;

***Trust and other services*** – examples of trust services include Internet Shopping is Safe (ISIS) ([www.imrg.org/isis](http://www.imrg.org/isis)) or TRUSTe ([www.truste.org](http://www.truste.org)) which authenticate the quality of service provided by companies trading on the web.

***Portals.*** The concept of the portal evolved to reflect the range of services offered by some online intermediaries. The term “portal” originated with reference to sites that were the default home pages of users. In other words, when users started their web browser, the first page they saw was their personal home page. When users use a newly installed browser it will be set up so that the home page is that of the company that produces it. In the case of Microsoft this is usually [www.msn.com](http://www.msn.com) (the Microsoft Network) and for broadband provider Orange in Europe it is [www.orange.com](http://www.orange.com)

A portal is a single Web interface that provides personalized access to information, applications, business processes, and much more. With portal technology, an organization can lower development and deployment costs and significantly increase productivity. Using a portal, information can be aggregated and integrated within a particular working environment, application, or service, or a single interface can be used to target an individual user’s needs and interests. Portals help to harmonize content, commerce, and collaboration with business goals.

A list of different types of portals and their capabilities follows:

- Line-of-business portals provide easy access to applications that serve a specific area, such as procurement or human resources.
- A corporate intranet portal often acts as a gateway to other portals and Web sites operated by an organization.
- Extranet portals act as an interface between companies, customers, and suppliers, revealing subsets of information to specific audiences.

- Customer service and self-service portals are often seen as subsets of a corporate extranet.

- Team or divisional portals are used by groups or communities that want to share specific content or business functions.

- A personal portal is geared to assist individuals who access information and resources.

- An enterprise portal is the central portal for an entire organization. It comprises all other portals deployed.

**Exchanges.** An exchange is a e-marketplace that connects many buyers with many suppliers. In addition to combining the functionalities of buy-side, e-procurement, and auction sites, they also have a number of other capabilities:

- Collaboration services (including multichannel services)

- Community services

- Web-automated workflow

- Integrated business process solutions

- Central coordination of global logistics for members, including warehousing and shipping services

- Integration services (systems/process integration into e-marketplace, trading partners, and service providers)

- Data mining, customized analysis and reporting, real-time transactions, trend and customer behavior tracking

- Transaction-flow managers

- Negotiation mechanisms

- Language translation

- Comprehensive links to related resources.

Business-to-Business (B2B) exchanges are electronic marketplaces in the Internet where suppliers and buyers interact to conduct transactions. B2B marketplaces can be defined as a World Wide Web site where goods and services can be bought from a wide range of suppliers.

Online exchanges allow participants to trade straightforwardly with a wide variety of buyers and sellers. Two of the biggest factors driving the growth of exchanges are that large businesses can use them to reduce stock holdings while small businesses can bid collectively to earn volume discounts or to jointly deliver a large contract.

***Electronic banking (Internet banking)*** - is a certain banking operations, carried out over computer networks (in Ukraine known as a system "Bank-Client"), or by the use of the Internet.

Electronic bank allows customers to access their accounts and perform different financial transactions. Transaction - elementary commercial performance - money transfer, confirmation of their acceptance, providing information on certain securities quotes. Together with identification and registration name for secure transactions lists of numbers of transactions are used, ie a set of one-time passwords used for only one banking operations.

Internet-Banking gives users the ability to:

- make all utility payments (electricity, gas, phone, heating, rent);
- pay bills for communication (IP telephony, cellular and paging, Internet) and other services (satellite, education, etc.);
- carry out remittances, including in foreign currency to any account in any bank;
- transfer money on the accounts for goods, including those acquired through Internet-shop;

- buy and sell foreign currency;
- to replenish or withdraw funds from accounts of plastic cards;
- to open different types of accounts (urgent, savings, retirement) and invest those funds;
- receive account statements for a certain period in a variety of formats;
- obtain information on payments received in real time;
- obtain information on payments and if necessary to refuse unpaid payment;
- to receive other services: subscribe magazines and newspapers, brokerage services (sale of securities), to create investment portfolio, take part in the formation of mutual funds of the bank bid.

To become a client of the virtual bank, the consumer must be connected to the Internet and install the appropriate software on computer. Opening a bank account, the user can conduct payments to service providers through the Internet, pay for utilities, purchase items in virtual shops etc.

The use of Internet banking offers the following advantages: significantly save time because there`s no need to visit bank; customer has a possibility to monitor their accounts 24 hours a day and according to the situation on the financial markets immediately react to these changes. As the costs to organize banking services over the Internet are rather small virtual banks of the most industrialized countries offer their customers high rates on deposits.

Wiring client to the Internet-banking is simple. It's enough to have access to the network, installed on the computer browser type MS Internet Explorer; to make agreement with a particular bank that offers such service; register and connect to the network.

Internet-banking systems that operate in Ukrainian and Russian segments of the network, usually composed of banking parts - software and hardware

installed in the bank and the client part - the same facilities installed in the clients.

On the technical equipment of the bank the following facilities are situated:

- Back-office - the database server. It saves all documents and customers opened digital signature keys, all customer information and guides.

- Internet-server. Customers visit Internet-server of the bank to conduct operations in the system. Here a secure protocol interaction, data encryption, digital signature mechanism are implemented;

- Gateway to the automated banking system (ABS). It provides communication between the Internet-banking system and ABS. The most common interaction with ABS - through the exchange of text files of a certain format.

The client part of the Internet-banking is a standard browser program, preferably with additional software modules provided by software developers of such systems.

In addition to the main components, the system of Internet-Banking has additional module safety: third-party products or security features built into the programs of browsers (CryptoAPI, SSL).

***Electronic brokerage services (also called Internet trading, Electronic trading, online trading)*** - the act of placing buy/sell orders for financial securities and/or currencies with the use of a brokerage's Internet-based proprietary trading platforms. The use of online trading increased dramatically in the mid- to late-'90s with the introduction of affordable high-speed computers and Internet connections.

Currently, the electronic brokerage services (Internet trading) are quite widespread. Sometimes called etrading, is a method of trading securities (such

as stocks, and bonds), foreign exchange or financial derivatives electronically. Information technology is used to bring together buyers and sellers through an electronic trading platform and network to create virtual market places. This type of trading and investing has become the norm for individual investors and traders since late 1990s with many brokers offering services via a wide variety of online trading platforms.

For many years stock exchanges were physical locations where buyers and sellers met and negotiated. Exchange trading would typically happen on the floor of an exchange, where traders in brightly colored jackets (to identify which firm they worked for) would shout and gesticulate at one another – a process known as open outcry or pit trading (the exchange floors were often pit-shaped – circular, sloping downwards to the centre, so that the traders could see one another). With the improvement in communications technology in the late 20th century, the need for a physical location became less important and traders started to transact from remote locations in what became known as electronic trading.<sup>[3]</sup> Electronic trading made transactions easier to complete, monitor, clear, and settle and this helped spur on its development.

Trading in the financial markets can broadly be split into two groups:

- Business-to-business (B2B) trading, often conducted on exchanges, where large investment banks and brokers trade directly with one another, transacting large amounts of securities, and
- Business-to-consumer (B2C) trading, where retail (e.g. individuals buying and selling relatively small amounts of stocks and shares) and institutional clients (e.g. hedge funds, fund managers or insurance companies, trading far larger amounts of securities) buy and sell from brokers or "dealers", who act as middle-men between the clients and the B2B markets.

The main advantage of online trading is an opportunity for private non-professional investors to invest in profitable assets. Electronic Brokerage Systems provide access to the financial market for medium and small banks, providing operational analysis of transactions on financial markets, rapid evaluation of potential profits and risks in various market segments.

The increase of electronic trading has had some important implications:

- Reduced cost of transactions – By automating as much of the process as possible (often referred to as "straight-through processing" or STP), costs are brought down. The goal is to reduce the incremental cost of trades as close to zero as possible, so that increased trading volumes don't lead to significantly increased costs. This has translated to lower costs for investors.
- Greater liquidity – electronic systems make it easier to allow different companies to trade with one another, no matter where they are located. This leads to greater liquidity (i.e. there are more buyers and sellers) which increases the efficiency of the markets.
- Greater competition – While electronic trading hasn't necessarily lowered the cost of entry to the financial services industry, it has removed barriers within the industry and had a globalisation-style competition effect. For example, a trader can trade futures on Eurex, Globex or LIFFE at the click of a button – he or she doesn't need to go through a broker or pass orders to a trader on the exchange floor.
- Increased transparency – Electronic trading has meant that the markets are less opaque. It's easier to find out the price of securities when that information is flowing around the world electronically.
- Tighter spreads – The "spread" on an instrument is the difference between the best buying and selling prices being quoted; it represents the

profit being made by the market makers. The increased liquidity, competition and transparency means that spreads have tightened, especially for commoditised, exchange-traded instruments.

For retail investors, financial services on the web offer great benefits. The primary benefit is the reduced cost of transactions for all concerned as well as the ease and the convenience. Web-driven financial transactions bypass traditional hurdles such as logistics.

In all investments, there is a risk of investment fraud. This risk can increase for online brokers where the investor does not have a personal relationship and the broker may be located in a different jurisdiction. For this reason some financial regulators warn potential investors to research the online brokers they plan to employ, assuring that those firms are licensed within their state, provincial or national jurisdiction.

The US Federal Government provides practical tips to avoid investment scams via their OnGuard Online website. This website cautions investors to be wary of Internet newsletters, investing blogs, or bulletin boards. Stock manipulators often float false information and "hot tips" on these sites, as part of an effort to affect the price of shares in a particular security. Investors are also advised to turn to unbiased sources when researching investments. In the US, the U.S. Securities and Exchange Commission (via their EDGAR database) is one example.

***Online insurance*** - a type of interaction between the insurance company and the client, when business processes are submitted to the Internet that occur during the marketing of insurance products, selling them to clients and the performance of mutual obligations of the parties under agreement.

Web-representation of the insurance company must ensure for the customer:

- details on the company's services;
- information about general and financial condition of the company;
- calculation of the insurance premium and determining the conditions of payment for each type of insurance, depending on the specific parameters;
- electronic copies of insurance and the possibility of filling;
- insurance, certified by electronic digital signature, directly to the customer via the Internet;
- the possibility of information exchange between the parties in the insurance case;
- the payment of insurance premiums to the client over the Internet in the insurance case;
- the possibility of information exchange between the insurer and the client during the period of the contract.

In general we can state that requirements for a successful e-commerce infrastructure are divided into 3 categories: legal, software and hardware perspectives. We will present the typical requirements for each category, along with what is missing and needed.

*1. Legal perspectives;* E-commerce laws and regulations: In European Union countries, E-commerce refers to the carrying out of business using electronic means. This generally means over the Internet. However, from a legal perspective, the term is often used to include remote selling by telephone and email, as well as online. It is also frequently used to refer to legal issues generally relating to the Internet.

There are several types of contracts which are required to exist when a business becomes involved in e-commerce transactions. As a result, laws should regulate each section of those contracts to ensure that online customers

transactions will go smooth and that a judge can have clear regulations to rule with once an online dispute occurs.

These include:

- Website development, content and hosting agreements. When a business wishes to set up a website, it needs to ensure that the design and content of the website do not infringe or violate any third party rights.

- Internet service provider agreements. Companies who are responsible for developing the e-commerce website can be the same company who provides the hosting service or they can be separate. Similar to the web design companies, web hosting companies should have clear responsibilities regarding their duties and responsibilities.

- Website usage and privacy policies This may include the privacy of both owners and customers. Web site design and hosting companies are not supposed to expose their clients' information to their rivals.

- Website and telephone sales terms and conditions. In some countries, online or telephone sales are governed by the Consumer Protection (Distance Selling) Regulations.

2. *Software perspective*; How to build an infrastructure for a trusted e-commerce websites: This section will focus on the software, websites requirements to implement e-services or business. In most e-commerce infrastructures, to secure access to e-commerce websites, we should include two basic components in order to allow users to securely perform online transactions:

- Digital certificates for web servers, providing guarantees of authentication, privacy and data integrity through encryption. Digital certificates can be issued by mediators called Certificate Authorities (CAs) to authenticate the seller to the buyer and vice versa.

- Secure e-payment system and management, to allow e-commerce sites to secure and automatically accept, manage and process online payments. This can be usually organized with owners' banks. Websites will be securely connected to the buyers' bank accounts. Once an online transaction is secured executed, the money should be directly transferred from the seller to the buyer account. This process should be performed in a fast, reliable and secure way. Those 3 elements (i.e. reliability, performance and security) are vital to the success of any e-commerce website.

- Network and hardware perspective; Internet readiness. A closely related requirement to the software and websites' requirements is the existence of a network or hardware infrastructure. This may include the routers, fiber optics or wireless communication channels, firewalls, etc. Since both (software and hardware perspectives) may include hardware and software elements, we will distinguish them through the location. This perspective represents any requirements outside the user machine.

- Extra requirements for a successful e-commerce business. Another major player in the e-commerce world is the shipping companies. In order to compete with normal shops and businesses, shipping should be also secure, reliable and quick. Laws should regulate the terms for shipping, such as costs, types, and who is in charge in case of products defects. Products defects may due to buyers or shipping issues.

### **TOPIC 3. BASIS OF GLOBAL COMPUTER NETWORK INTERNET FUNCTIONING.**

- 3.1. Basic principles of Internet.
- 3.2. The most common services of Internet.
- 3.3. The concept and structure of Internet marketing.

### ***3.1. Basic principles of Internet.***

The technology juggernauts behind e-commerce are the Internet and the World Wide Web. Without both of these technologies, e-commerce, as we know it, would be impossible. The Internet is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link billions of devices worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and peer-to-peer networks for file sharing.

The origins of the Internet date back to research and development commissioned by the United States government, the Government of the UK and France in the 1960s to build robust, fault-tolerant communication via computer networks. This work, led to the primary precursor networks, the ARPANET, in the United States. The Internet, a global computer network that embraces millions of users all over the world, began as a military experiment. It was designed to survive a nuclear war.

The interconnection of regional academic networks in the 1980s marks the beginning of the transition to the modern Internet. From the late 1980s

onward, the network experienced sustained exponential growth as generations of institutional, personal, and mobile computers were connected to it.

The Internet is a worldwide network of computer networks built on common standards. Created in the late 1960s to connect a small number of mainframe computers and their users, the Internet has since grown into the world's largest network, connecting over 500 million computers worldwide. The Internet links businesses, educational institutions, government agencies, and individuals together, and provides users with services such as e-mail, document transfer, newsgroups, shopping, research, instant messaging, music, videos, and news.

Figure 3.1 illustrates one way to measure the growth of the Internet, by looking at the number of Internet hosts with domain names. (An Internet host is defined by the Internet Software Consortium, which conducts this survey, as any IP address that returns a domain name in the in-addr.arpa domain, which is a special part of the DNS namespace that resolves IP addresses into domain names.)

**World Wide Web.** The World Wide Web (the Web) is the most popular service that runs on the Internet infrastructure. The Web was developed in the early 1990s and hence is of much more recent vintage than the Internet. The Web provides easy access to over 8 billion Web pages created in a language called HTML (HyperText Markup Language). These HTML pages contain information – including text, graphics, animations, and other objects – made available for public use. **Hypertext Transfer Protocol (HTTP)** is the main access protocol of the World Wide Web. **Web services** also use HTTP to allow software systems to communicate in order to share and exchange business logic and data.

Many people use the terms Internet and World Wide Web, or just the Web, interchangeably, but the two terms are not synonymous. The **World Wide Web** is the primary application that billions of people use on the Internet, and it has changed their lives immeasurably. However, the Internet provides many other services. The Web is a global set of **documents, images** and other resources, logically interrelated by **hyperlinks** and referenced with **Uniform Resource Identifiers (URIs)**. URIs symbolically identify services, **servers**, and other databases, and the documents and resources that they can provide.

World Wide Web browser software, such as Microsoft's Internet Explorer, Mozilla Firefox, Opera, Apple's Safari, and Google Chrome, lets users navigate from one web page to another via hyperlinks embedded in the documents. These documents may also contain any combination of computer data, including graphics, sounds, text, video, multimedia and interactive content that runs while the user is interacting with the page. Client-side software can include animations, games, office applications and scientific demonstrations. Through keyword-driven Internet research using search engines like Yahoo! and Google, users worldwide have easy, instant access to a vast and diverse amount of online information. Compared to printed media, books, encyclopedias and traditional libraries, the World Wide Web has enabled the decentralization of information on a large scale.

The Web has also enabled individuals and organizations to publish ideas and information to a potentially large audience online at greatly reduced expense and time delay. Publishing a web page, a blog, or building a website involves little initial cost and many cost-free services are available. However, publishing and maintaining large, professional web sites with attractive,

diverse and up-to-date information is still a difficult and expensive proposition.

Advertising on popular web pages can be lucrative, and e-commerce or the sale of products and services directly via the Web continues to grow.

You can find an exceptionally wide range of information on Web pages, ranging from the entire catalog of Sears Roebuck, to the entire collection of public records from the Securities and Exchange Commission, to the card catalog of your local library, to millions of music tracks (some of them legal), and videos. The Internet prior to the Web was primarily used for text communications, file transfers, and remote computing. The Web introduced far more powerful and commercially interesting, colorful multimedia capabilities of direct relevance to commerce. In essence, the Web added color, voice, and video to the Internet, creating a communications infrastructure and information storage system that rivals television, radio, magazines, and even libraries.

The basis of Internet functioning is protocol TCP/IP (Transmission Control Protocol/Internet Protocol). It is a set of protocols - standards and rules of communication and transmission of information in the global network.

*Protocol* - agreement on signals exchanged between computers during communication between themselves and receiving or transmitting information.

TCP/IP is a two-layer program. The higherlayer, Transmission Control Protocol, manages the assembling of a message or file into smallerpackets that are transmitted over the Internet and received by a TCP layer that reassembles the packets into the original message. The lower layer, Internet Protocol, handles the address part of each packet so that it gets to the right destination.

Each gateway computer on the network checks this address to see where to forward the message. Even though some packets from the same message are routed differently than others, they'll be reassembled at the destination.

TCP/IP uses the client/server model of communication in which a computer user (a client) requests and is provided a service (such as sending a Web page) by another computer (a server) in the network. TCP/IP communication is primarily point-to-point, meaning each communication is from one point (or host computer) in the network to another point or host computer. TCP/IP and the higher-level applications that use it are collectively said to be “stateless” because each client request is considered a new request unrelated to any previous one (unlike ordinary phone conversations that require a dedicated connection for the call duration). Being stateless frees network paths so that everyone can use them continuously.

One computer can simultaneously operate multiple applications servers, email server, the teleconference server and others. And usually the user's computer simultaneously run several Internet client software, such as two client applications: for e-mail program and browser for viewing Web-hypertext documents.

*The Internet server* - computer or a program that provides services to other computers or programs.

*Client* - a computer or a program that uses the resources of the Internet server.

Internet Servers are installed in organizations (service providers) that provide commercial network services to individual and collective users, as well as to academic institutions, state institutions, some private firms. These servers are also called hosts (or network nodes).

*Service providers* - institutions that provide commercial services to connect to the Internet (Internet service provider, ISP).

Service Provider disposes with constant computer network connected to the Internet, within which there are access servers. Connection to Internet subscribers is realized by their help – to individuals or entire networks of local institutions. Communication between servers is supported around the clock access through a permanent system of highways, tunnels and interchanges, through which information continuously moves.

The principles of Internet functioning are quite clear to the average user. Each node has its own Internet computer address. Each part of the address after the @ symbol is called the domain. On the Internet, a domain consists of a set of network addresses. This domain is organized in levels. The top level identifies geographic or purpose commonality (for example, the nation that the domain covers or a category such as "commercial"). The second level identifies a unique place within the top level domain and is, in fact, equivalent to a unique address on the Internet (an IP address). Lower levels of domain may also be used.

Domain hierarchy is often created by geography. Top-level domains have the following meanings:

- .ua - Ukraine;
- .ru - Russia;
- .su - post-Soviet countries;
- .uk - United Kingdom;
- .de - Germany;
- .com - commercial companies;
- .net - network organization;
- .edu - universities, other educational institutions;

.org - state and public institutions.

Sometimes node Internet address (IP-address) is written in the most understandable for computer way - numerically, such as 193.193.197.218.

IP-address - 32-bit address inherent in each node of the network; contains two components: node number and network number. Under the new standard IP protocol IP-address can be up to 128 bits.

Most Internet users are on normal PCs. Number of Internet services available to them depends on the type of connection to the network.

Common methods of Internet access by users include dial-up with a computer modem via telephone circuits, broadband over coaxial cable, fiber optic or copper wires, Wi-Fi, satellite and cellular telephone technology (3G, 4G).

### *3.2. The most common services of Internet.*

**Communication.** Email is an important communications service available on the Internet. The concept of sending electronic text messages between parties in a way analogous to mailing letters or memos predates the creation of the Internet. Pictures, documents and other files are sent as email attachments.

Internet telephony is another common communications service made possible by the creation of the Internet. VoIP stands for Voice-over-Internet Protocol, referring to the protocol that underlies all Internet communication. The idea began in the early 1990s with walkie-talkie-like voice applications for personal computers. In recent years many VoIP systems have become as easy to use and as convenient as a normal telephone. The benefit is that, as the Internet carries the voice traffic, VoIP can be free or cost much less than a

traditional telephone call, especially over long distances and especially for those with always-on Internet connections such as cable or ADSL. VoIP is maturing into a competitive alternative to traditional telephone service. Interoperability between different providers has improved and the ability to call or receive a call from a traditional telephone is available. Simple, inexpensive VoIP network adapters are available that eliminate the need for a personal computer.

Voice quality can still vary from call to call, but is often equal to and can even exceed that of traditional calls. Remaining problems for VoIP include emergency telephone number dialing and reliability. Currently, a few VoIP providers provide an emergency service, but it is not universally available.

Video chat rooms and video conferencing are also popular with many uses being found for personal webcams, with and without two-way sound. YouTube was founded on 15 February 2005 and is now the leading website for free streaming video with a vast number of users. It uses a flash-based web player to stream and show video files. Registered users may upload an unlimited amount of video and build their own personal profile. YouTube claims that its users watch hundreds of millions, and upload hundreds of thousands of videos daily. Currently, YouTube also uses an HTML5 player.

**Data transfer.** File sharing is an example of transferring large amounts of data across the Internet. A computer file can be emailed to customers, colleagues and friends as an attachment. It can be uploaded to a website or File Transfer Protocol (FTP) server for easy download by others. It can be put into a "shared location" or onto a file server for instant use by colleagues. The load of bulk downloads to many users can be eased by the use of "mirror" servers or peer-to-peer networks. In any of these cases, access to the file may be controlled by user authentication, the transit of the file over the Internet

may be obscured by encryption, and money may change hands for access to the file. The price can be paid by the remote charging of funds from, for example, a credit card whose details are also passed – usually fully encrypted – across the Internet. The origin and authenticity of the file received may be checked by digital signatures or by MD5 or other message digests. These simple features of the Internet, over a worldwide basis, are changing the production, sale, and distribution of anything that can be reduced to a computer file for transmission. This includes all manner of print publications, software products, news, music, film, video, photography, graphics and the other arts. This in turn has caused seismic shifts in each of the existing industries that previously controlled the production and distribution of these products.

Streaming media is the real-time delivery of digital media for the immediate consumption or enjoyment by end users. Many radio and television broadcasters provide Internet feeds of their live audio and video productions. They may also allow time-shift viewing or listening such as Preview, Classic Clips and Listen Again features. These providers have been joined by a range of pure Internet "broadcasters" who never had on-air licenses. This means that an Internet-connected device, such as a computer or something more specific, can be used to access on-line media in much the same way as was previously possible only with a television or radio receiver. The range of available types of content is much wider, from specialized technical webcasts to on-demand popular multimedia services.

### ***3.3. The concept and structure of Internet marketing.***

Internet marketing (IM), or online marketing, means using the Internet to market and sell goods and services. A great deal of IM activity is directed toward driving customers to an organization's website, where they are encouraged to make purchases online or through another channel. But IM encompasses a broad and growing range of strategies for interacting online with customers and with other stakeholders. The most common IM activities include: preparing an organization's website, placing advertisements on the web, sending email messages, and engaging in "search engine marketing" – efforts to have the organization's name appear at the top of the list when a customer searches the Internet for a particular product or service. In addition to these basics, Internet marketing can include a range of other activities, such as marketing through online games, mobile phones, or direct response television broadcasts. And IM efforts can be directed not only to customers, but also to employees, investors, and other stakeholders (i.e. trading partners, stockholders, media and public interest groups).

New ways to segment markets, personalize experiences, and respond to expressions of interest create both opportunity and complexity for organizations and their customers. And the impact of online marketing extends far beyond customers. Organizations' external and in-house websites are becoming primary centers for managing relationships with employees, trading partners, stockholders, and the media.

Internet marketing can also be broken down into more specialized areas such as Web marketing, email marketing and social mediemarketing:

1) *Web marketing* includes e-commerce of Web sites, affiliate marketing Web sites, promotional or informative Web sites, online advertising on search engines, and organic search engine results via search engine optimization (SEO).

2) *Email marketing* involves both advertising and promotional marketing efforts via e-mail messages to current and prospective customers.

3) *Social media marketing* involves both advertising and marketing (including viral marketing) efforts via social networking sites like Facebook, Twitter, YouTube.

For most people running a company in the 21st century, Internet marketing strategies are an indispensable part of the business plan. While small businesses such as local shops may require some form of web marketing, any business that wants a broad customer reach should research the potential of a solid Internet marketing strategy.

Many common online advertising practices are controversial and increasingly subject to regulation. Online ad revenues may not adequately replace other publishers' revenue streams. Declining ad revenue has led some publishers to hide their content behind paywalls.

*Display advertising* conveys its advertising message visually using text, logos, animations, videos, photographs, or other graphics. Display advertisers frequently target users with particular traits to increase the ads' effect. Online advertisers (typically through their ad servers) often use cookies, which are unique identifiers of specific computers, to decide which ads to serve to a particular consumer. Cookies can track whether a user left a page without buying anything, so the advertiser can later retarget the user with ads from the site the user visited.

As advertisers collect data across multiple external websites about a user's online activity, they can create a detailed picture of the user's interests to deliver even more targeted advertising. This aggregation of data is called behavioral targeting. Advertisers can also target their audience by using contextual and semantic advertising to deliver display ads related to the

content of the web page where the ads appear. Retargeting, behavioral targeting, and contextual advertising all are designed to increase an advertiser's return on investment, or ROI, over untargeted ads.

Advertisers may also deliver ads based on a user's suspected geography through geotargeting. A user's IP address communicates some geographic information (at minimum, the user's country or general region). The geographic information from an IP can be supplemented and refined with other proxies or information to narrow the range of possible locations. For example, with mobile devices, advertisers can sometimes use a phone's GPS receiver or the location of nearby mobile towers. Cookies and other persistent data on a user's machine may provide help narrowing a user's location further.

*Web banner advertising.* Web banners or banner ads typically are graphical ads displayed within a web page. Many banner ads are delivered by a central ad server.

Banner ads can use rich media to incorporate video, audio, animations, buttons, forms, or other interactive elements using Java applets, HTML5, Adobe Flash, and other programs.

*Frame ad (traditional banner).* Frame ads were the first form of web banners. The colloquial usage of "banner ads" often refers to traditional frame ads. Website publishers incorporate frame ads by setting aside a particular space on the web page. The Interactive Advertising Bureau's Ad Unit Guidelines proposes standardized pixel dimensions for ad units.

*Pop-ups/pop-unders.* A pop-up ad is displayed in a new web browser window that opens above a website visitor's initial browser window. A pop-under ad opens a new browser window under a website visitor's initial browser window.

*News Feed Ads.* "News Feed Ads", also called "Sponsored Stories", "Boosted Posts", typically exist on Social Media Platforms that offer a steady stream of information updates ("news feed") in regulated formats (i.e. in similar sized small boxes with a uniform style). Those advertisements are intertwined with non-promoted news that the users are reading through. Those advertisements can be of any content, such as promoting a website, a fan page, an app, or a product. Some examples are: Facebook's "Sponsored Stories", LinkedIn's "Sponsored Updates", and Twitter's "Promoted Tweets".

This display ads format falls into its own category because unlike banner ads which are quite distinguishable, News Feed Ads' format blends well into non-paid news updates. This format of online advertisement yields much higher click-through rates than traditional display ads

*Online classified advertising* is advertising posted online in a categorical listing of specific products or services. Examples include online job boards, online real estate listings, automotive listings, online yellow pages, and online auction-based listings. Craigslist and eBay are two prominent providers of online classified listings.

### *The Advantages & Disadvantages of Advertising on the Internet*

#### **Advantages:**

- The Internet's vast reach can allow advertisers to reach significantly more people than traditional advertising media at a fraction of the cost. Internet advertising is ideal for businesses with a national or international target market and large-scale distribution capabilities. As a rule, the more people your business serves, the most cost-efficient internet advertising can be. Internet advertising can also be more targeted than some traditional media, ensuring that your messages are seen by the most relevant audiences.

- Market segmentation and target marketing are more effective on the Internet than any other advertising medium. Strategically placed Web advertisements can achieve 100-percent relevant views.

- Advertising on the Internet is much more cost-efficient than using traditional mass market and niche media. Internet ads can be viewed by millions of people while being displayed all day and night, while television or radio ads generally last less than two minutes and are shown a limited number of times per day. Cooperative advertising arrangements such as banner and link swaps can be completely free, allowing you to reach large audiences with no expense.

### **Disadvantages**

Since many consumers spend time shopping online for everything from groceries and clothing to electronics and cleaning supplies, many businesses include online advertising in their marketing strategies. While the benefits of advertising online include the potential to reach a large market and the ability to measure results, online advertising also presents some disadvantages.

- One disadvantage of advertising on the Internet is that your marketing materials are automatically available for anyone in the world to copy, regardless of the legal ramifications. Logos, images and trademarks can be copied and used for commercial purposes, or even to slander or mock your company. This is not the case with television and magazine advertising, wherein images must be replicated rather than simply copied electronically.

- Consumers are so used to seeing advertising on television, hearing radio commercials and flipping through advertisements in magazines, they've developed an aversion to all forms of advertising. This is also the case with online advertising, where consumers can avoid clicking banner advertisements, bypass ads in online videos they watch and close pop-up

advertisements as soon as they come up on their screens. Customers are in control of which advertising messages they want to click and respond to.

- Website downtime, lags in website or video loading and browser complications can reduce the number of times consumers see online advertisements and how well they see them. When technical issues occur, companies lose the opportunity to broadcast advertisements for their products and services and may lose potential sales. Viewing problems can occur because of problems with a website or if a consumer is using a smart phone or other mobile device to view a website, has a slow connection speed or does not have the correct applications and programs installed on his computers for proper viewing.

- Pricing for advertising online can range from inexpensive - \$20-a-month placements on local parenting blogs - to thousands of dollars on popular sites such as the New York Times. The cost for banner, text and video ads vary depending on the amount of traffic and the type of readership a website or blog receives. Online advertising through pay-per-click campaigns and social media sites can also wreak havoc on a company's marketing budget, potentially yielding little to no return on investment.

- The Internet offers a wide range of websites on which companies can place advertisements. This can be overwhelming, especially for small business owners. With so many options, it's difficult to narrow down the choices to the websites that will attract the most potential customers and sales. Once a company selects a website, it is then presented with a variety of ways it can advertise its products or services on the site, such as through banner advertisements, video marketing or by sponsoring a post. Companies have to determine which type of advertisement yields the best response from their target markets.

- The nature of a lot of display advertising is intrusive, so pop-up blockers can often prevent ads from being served as they were intended by the advertisers. Most browsers now block pop-ups. There are also extensions available for the Firefox browser, such as Adblock Plus, that will block advertising on Web pages. Technologically savvy consumers are increasingly using these methods to limit the advertising that they see.

- Bandwidth can also be an issue, although this is a shrinking problem. However, campaigns should be planned around demographics in determining the richness (and investment) of interaction. For example, heart disease medication is likely to appeal to an older community with less money and slower connection speeds.

## **TOPIC 4. E-COMMERCE SYSTEMS IN CORPORATE SECTOR**

4.1. The basic processes of implementation of electronic commerce in the B2B sector. Virtual enterprise, internet incubator, mobile commerce.

4.2. The Role of Supply-Chain Management (SCM) and Customer relationship management (CRM) in e-commerce.

### ***4.1. The basic processes of implementation of electronic commerce in the B2B sector. Virtual enterprise, internet incubator mobile, commerce.***

Business-to-business (B2B) refers to a situation where one business makes a commercial transaction with another. This typically occurs when:

- A business is sourcing materials for their production process, e.g. a food manufacturer purchasing salt.

- A business needs the services of another for operational reasons, e.g. a food manufacturer employing an accountancy firm to audit their finances.
- A business re-sells goods and services produced by others, e.g. a retailer buying the end product from the food manufacturer.

Contrasting terms are business-to-consumer (B2C) and business-to-government (B2G).

The overall volume of B2B (Business-to-Business) transactions is much higher than the volume of B2C transactions. The primary reason for this is that in a typical supply chain there will be many B2B transactions involving sub components or raw materials, and only one B2C transaction, specifically sale of the finished product to the end customer. For example, an automobile manufacturer makes several B2B transactions such as buying tires, glass for windshields, and rubber hoses for its vehicles. The final transaction, a finished vehicle sold to the consumer, is a single (B2C) transaction.

B2B e-commerce describes the electronic commerce between businesses at the level of manufacturers, wholesalers, and retailers as opposed to between companies and the general public or governments. A company's finished product is often the result of multiple B2B transactions that help create a supply chain and furnish it with the goods and materials needed to manufacture that product. The acquisition and transport of supplies invariably requires shipping, the e-commerce value of which has more than doubled in almost every sector in the United States since 2003, and, according to recent statistics, e-commerce transactions in manufacturing shipments have also grown to embody almost half of the value of all manufacturing shipments.

The e-commerce value of wholesale trade, an intermediate step in product distribution, is also a major theme in B2B e-commerce. E-commerce made up roughly 18 percent of the entire merchant wholesale trade sales in 2011, with

a value of over 1.5 trillion U.S. dollars. Current market data is often divided up by sector and details the e-commerce value of wholesale trade of industries such as motor vehicles and automotive equipment or furniture, among others.

Transactions between businesses are not limited to retail and the preparation for the sale of products. Communication and marketing between businesses are also important for the success of B2B sector, and businesses even use social media platforms to help form and maintain relations with other businesses.

In a report released in 2015, Forrester Research Inc. forecasts that business-to-business e-commerce sales in the United States will reach \$780 billion this year – more than twice the most recent figure of \$304.91 billion in U.S. retail e-commerce sales released by the U.S. Department of Commerce, for 2014 – and is on course to grow at a compound annual growth rate of 7.7% until it reaches \$1.13 trillion in 2020.

***E-procurement*** (electronic procurement, sometimes also known as supplier exchange) is the B2B or B2C or B2G purchase and sale of supplies, work, and services through the Internet as well as other information and networking systems, such as electronic data interchange and enterprise resource planning.

The e-procurement value chain consists of management, e-tendering, e-auctioning, vendor management, catalogue management, purchase order integration, order status, advanced shipping notice, e-invoicing, e-payment, and contract management. Indent management is the workflow involved in the preparation of tenders.

This field is populated by two types of vendors: big enterprise resource planning (ERP) providers which offer e-procurement as one of their services, and the more affordable services focused specifically of e-procurement.

A *virtual enterprise* is a temporary alliance of businesses that come together to share skills or core competencies and resources in order to better respond to business opportunities, and whose cooperation is supported by computer networks. Virtual enterprises have little or no physical presence or infrastructure, rely heavily on telecommunications and networks such as internet, and usually disband when their purpose is fulfilled or the opportunity passes. Agile, flexible, and fluid, they are extremely focused and goal driven, and succeed on the basis of little investment requirements, low startup and overhead costs, and fast response time. Geographically dispersed members of a virtual enterprise collaborate on the basis of their core strengths from wherever they are and whenever they are able to do so, and may become competitors in pursuit of another opportunity. Also called virtual company or virtual corporation.

Virtual enterprises have some common characteristics summarized as:

- boundary crossing
- complementary core competencies
- geographical dispersion
- complementary nature of the partners
- participant equality
- extensive use of information and communications technology
- temporality
- no creation of a new legal entity

As with all types of enterprises, virtual enterprises present both benefits and challenges. Benefits include more economical connections with suppliers, greater opportunities to create revenue, more efficient operations, and a reduction in administrative costs. Challenges facing virtual enterprises are:

inexperienced users, security, expense control, and the level of incorporation required to create a successful virtual enterprise.

***Virtual business incubator.*** Business incubators began in the 1950s and took off in the late 1990s as a support for startup companies who need advice and venture capital to get their ideas off the ground. As the dot-com bubble burst, many high-tech business incubators did so too. Now the model of a business incubator is changing. Several of the incubator companies who survived the dot-com bubble switched to a virtual model.

The old incubator model required a startup venture to set up shop at the incubator's site. The virtual model, on the other hand, allows a company to garner the advice of an incubator without actually being located at the incubator site. This new model suits those entrepreneurs who need the advice an incubator offers but still want to maintain their own offices, warehouses, etc.

Physical incubation has some disadvantages. It is relatively capital intensive and outreach is limited by the available office space and the start-ups operating within the geographical area. What's more, the physical space offered by the incubator may not equally suit the needs of all start-up enterprises. Virtual business incubators, on the other hand, provide services beyond the confines of a physical building. This allows a company to use the services of an incubator, without actually being located at the incubator site, for instance through extension workers, online tools and off-site advisory services. They can also serve a much larger number of companies over an extended geographical area. However, virtual business incubation is a tool in search of a business model. For physical incubators, a major source of income is rent for business premises, but this form of income is not available to virtual business incubators. A number of models are emerging, categorised in this

report as hand-holders, network boosters and seed capital providers. But their viability and effectiveness is not yet well understood.

Disadvantages of virtual business incubators are:

1. Lack of trust while working online (hard to motivate team)
2. Investors prefer to invest within their local geographical boundaries (it's easier to control the money. However, there is a crowdfunding and crowdinvesting trend).
3. Not always transactional costs of incubating online could be lower than in the physical incubation or acceleration.
4. The culture is an issue while you are starting up. It's becoming more evident when you work online.
5. Project management, tracking and team work is much harder while working online.

But online or virtual feature of business incubator provide an entrepreneur with useful resources and structured content with mentors, experts and even crowd investors available online. This feature will allow to grow entrepreneurs.

***Mobile e-commerce (m-commerce)*** is a term that describes online sales transactions that use wireless electronic devices such as hand-held computers, mobile phones or laptops. These wireless devices interact with computer networks that have the ability to conduct online merchandise purchases. Known as next-generation e-commerce, m-commerce enables users to access the Internet without a need to find a place to plug in. Mobile-commerce-related services spread rapidly in early 2000.

The spheres affected by m-commerce include:

- Financial services, which include 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.

Device vendors target younger generations who use mobile phones more than any other age group, prompting online vendors to collaborate with big names in the telecommunications industry to promote the advancement of e-commerce to m-commerce such that users can shop online from their phones. Most of these advances are accomplished through sophisticated application designs that are constantly emerging and evolving.

One of the features of m-commerce sites is the adaptation of websites to make them easier to use with smaller screen sizes. There are a number of adaptations that can be made including the removal of large graphics and the optimization of fonts for easier viewing and ergonomics.

#### ***4.2. The Role of Supply-Chain Management (SCM) and Customer relationship management (CRM) in e-commerce.***

Developing an e-business strategy requires a fusion of existing approaches to business, marketing, supply chain management and information systems strategy development. In addition to traditional strategy approaches, commentators have exhorted companies to apply innovative techniques to achieve competitive advantage. Those companies that have successfully

managed the transformation to e-business such as Cisco, Dell, General Motors, HSBC and IBM, and, in Europe, easyJet and British Telecom, have done so by applying traditional strategy approaches. At the same time there have been many start-ups featured as cases in previous chapters such as eBay, Lastminute.com and Zopa.com that have succeeded through innovative business models. But these companies also have succeeded through applying established principles of business strategy, planning and risk management.

The characteristics of a multi-channel e-business strategy are:

- E-business strategy is a channel strategy;
- Specific e-business objectives need to be set to benchmark adoption of e-channels;

Right-channelling can be summarized as: *reaching the right customer using the right channel with the right message or offering at the right time;*

When reviewing e-business strategy options, there will be a range of possible strategies and e-business service alternatives to be evaluated. Limited resources will dictate that only some applications are practical. For example, typical alternative e-business strategy options for an organization which has a brochureware site might be to implement:

- transactional e-commerce facility;
- online catalogue facility;
- e-CRM system – lead generation system;
- e-CRM system – customer service management;
- e-CRM system – personalization of content for users;
- e-procurement system for office supplies;
- partner relationship management extranet for distributors and agents;
- social network or customer forum.

*Customer relationship management (CRM)* is an approach to managing a company's interaction with current and future customers. The *e-CRM* or *electronic customer relationship management* encompasses all the CRM functions with the use of the net environment i.e., intranet, extranet and internet. Electronic CRM concerns all forms of managing relationships with customers making use of information technology (IT). e-CRM is enterprises using IT to integrate internal organization resources and external "marketing" strategies to understand and fulfill their customers needs. Comparing with traditional CRM, the integrated information for e-CRM intraorganizational collaboration can be more efficient to communicate with customers.

CRM software consolidates customer information and documents into a single CRM database so business users can more easily access and manage it. The other main functions of this software include recording various customer interactions (over email, phone calls, social media or other channels, depending on system capabilities), automating various workflow processes such as tasks, calendars and alerts, and giving managers the ability to track performance and productivity based on information logged within the system.

Common features of CRM software include:

- *Marketing automation:* CRM tools with marketing automation capabilities can automate repetitive tasks to enhance marketing efforts to customers at different points in the lifecycle. For example, as sales prospects come into the system, the system might automatically send them marketing materials, typically via email or social media, with the goal of turning a sales lead into a full-fledged customer.
- *Sales force automation:* Also known as sales force management, sales force automation is meant to prevent duplicate efforts between a salesperson

and a customer. A CRM system can help achieve this by automatically tracking all contact and follow-ups between both sides.

- *Contact center automation:* Designed to reduce tedious aspects of a contact center agent's job, contact center automation might include pre-recorded audio that assists in customer problem-solving and information dissemination. Various software tools that integrate with the agent's desktop tools can handle customer requests in order to cut down the time of calls and simplify customer service processes.

- *Geolocation technology, or location-based services:* Some CRM systems include technology that can create geographic marketing campaigns based on customers' physical locations, sometimes integrating with popular location-based GPS apps. Geolocation technology can also be used as a networking or contact management tool in order to find sales prospects based on location.

Self-services are becoming increasingly important in CRM activities. The rise of the Internet and e-CRM has boosted the options for self-service activities. A critical success factor is the integration of such activities into traditional channels. An example was Ford's plan to sell cars directly to customers via its Web Site, which provoked an outcry among its dealers network. CRM activities are mainly of two different types. Reactive service is where the customer has a problem and contacts the company. Proactive service is where the manager has decided not to wait for the customer to contact the firm, but to be aggressive and contact the customer himself in order to establish a dialogue and solve problems.

A customer relationship management system is a central location or piece of software that you can use to store customer details, accounts, information and leads that can then be leveraged for future sales opportunities. Small and

large businesses will benefit from some e-commerce CRM systems in that they firmly place client data in the “cloud” - which means that it can be accessed by multiple people, anywhere, at any time, from any number of mobile devices. For the mobile developer who has spent time, energy and money building a responsive mobile e-commerce website, CRM is more important than ever.

Electronic Customer Relationship Management (e-CRM) is becoming increasingly important to remain competitive. For retailers, there are such benefits:

- Improve customer service and satisfaction through e-CRM.
- Personalize service, optimize marketing, and improve customer relations by co-ordinating customer information for electronic, telephone, and store-based formats.
- Reduce customer service costs through "self-service" features such as search functions and order delivery status.
- Grow profitability by analyzing customer information to optimize marketing efforts.

e-CRM generally includes an electronic sales platform - for some customers, sales is their only contact with the company - as well as gathers and co-ordinates customer information.

Information can be used for several purposes:

- Customer service: Whichever medium the customer uses, sales and service personnel can quickly identify the individual's essential background information such as location, recent purchases, account history, and payment status.

- Self-service: Customers can access Web-based or telephone-based electronic systems to track their own orders, identify the nearest store outlet, or find the answer to a question.

- Customer analysis: Retailers use customer information and buying data to guide purchasing and marketing as well as to improve service efforts.

Being unfamiliar with relationship marketing, most respondents think that e-Commerce is actually an online shop on the Web through which buying/paying takes place and currently it is fashionable having it on the web site of your company. €They do not understand the full concept of e-commerce that is used for management of all buying and selling activities, including building of long-term relationships with consumers. In line with this, the failure to understand the causality between business success and CRM use, i.e. e-commerce and lack of understanding of the moment in which the world is now, are key factors in absence of implementing CRM and e-Commerce at the level required by the current moment.

Some of the major issues relating to CRM failure are the following:

- Difficulty in measuring and valuing intangible benefits.
- Failure to identify and focus on specific business problems.
- Lack of active senior management sponsorship.
- Poor user acceptance.
- Trying to automate a poorly defined process.

The effective and efficient employment of CRM activities cannot go without the remarks of safety and privacy. CRM systems depend on databases in which all kinds of customer data is stored. In general, the following rule applies: the more data, the better the service companies can deliver to individual customers. Some known examples of these problems are conducting credit-card transaction online of the phenomenon known as

'cookies' used on the Internet in order to track someone's information and behavior. The design and the quality of the website are also very important aspects that influence the level of trust customers experience and their willingness or reluctance to conduct a transaction or leave personal information.

Privacy policies can be ineffective in relaying to customers how much of their information is being used. In a recent study by The University of Pennsylvania and University of California, it was revealed that over half the respondents have an incorrect understanding of how their information is being used. They believe that, if a company has a privacy policy, they will not share the customer's information with third party companies without the customer's express consent. Therefore, if marketers want to use consumer information for advertising purposes, they must clearly illustrate the ways in which they will use the customer's information and present the benefits of this in order to acquire the customer's consent. Privacy concerns are being addressed more and more. Legislation is being proposed that regulates the use of personal data. Also, Internet policy officials are calling for more performance measures of privacy policies.

Statistics on privacy:

- 38% of retailers don't talk about privacy in their sign up or welcome email
- About 50% of major online retailers discuss privacy concerns during the email subscription process

As the use of the Internet, electronic CRM solutions, and even the existence of e-business are rising, so are the efforts to further develop the systems being used and to increase their safety for customers, in order to further reap the benefits of their use.

***Supply chain management (SCM)*** involves the coordination of all supply activities of an organization from its suppliers and delivery of products to its customers.

For most commercial and not-for-profit organizations we can distinguish between *upstream supply chain* activities which are equivalent to buy-side e-commerce and *downstream supply chain* activities which correspond to sell-side e-commerce. Because each company effectively has many individual supply chains for different products, the use of the term ‘chain’ is limiting and supply chain network is a more accurate reflection of the links between an organization and its partners. The existence of this network increases the need for electronic communications technology to manage and optimize this network.

Technology is vital to supply chain management since managing relationships with customers, suppliers and intermediaries is based on the flow of information and the transactions between these parties. The main strategic thrust of enhancing the supply chain is to provide a superior value proposition to the customer, of which efficient consumer response is important within the retail and packaged consumer goods market. Improving customer value involves improving product quality, customer service quality and/or reducing price and fulfilment times. An alternative emphasis is on increasing efficiency in obtaining resources from a supplier organization or distributing products to customers. This emphasis is about reducing operational costs and so increasing profitability.

Supply chain management flows can be divided into three main flows:

- The product flow
- The information flow
- The finances flow

The product flow includes the movement of goods from a supplier to a customer, as well as any customer returns or service needs. The information flow involves transmitting orders and updating the status of delivery. The financial flow consists of credit terms, payment schedules, and consignment and title ownership arrangements.

There are two main types of SCM software: planning applications and execution applications. Planning applications use advanced algorithms to determine the best way to fill an order. Execution applications track the physical status of goods, the management of materials, and financial information involving all parties.

Some SCM applications are based on open data models that support the sharing of data both inside and outside the enterprise (this is called the extended enterprise, and includes key suppliers, manufacturers, and end customers of a specific company). This shared data may reside in diverse database systems, or data warehouses, at several different sites and companies.

By sharing this data "upstream" (with a company's suppliers) and "downstream" (with a company's clients), SCM applications have the potential to improve the time-to-market of products, reduce costs, and allow all parties in the supply chain to better manage current resources and plan for future needs.

Increasing numbers of companies are turning to Web sites and Web-based applications as part of the SCM solution. A number of major Web sites offer e-procurement marketplaces where manufacturers can trade and even make auction bids with suppliers.

The impact of e-commerce on the supply chain is felt in how work is done, including how areas of the supply chain interact, and in how supply chains operate between company and geographic boundaries. E-commerce

affects all major areas of supply chain work in companies from design, through buying to fulfilment and service support.

E-commerce will have its greatest impact:

1. Indirect procurement and direct procurement: E-commerce has a direct impact on both indirect and direct procurement of goods and services. E-procurement has its greatest effect on change management and compliance. Direct procurement represents a bigger prize for most companies than indirect spend simply because of the size of direct spends. Here, the combination of e-commerce procurement solutions with existing ERP and MRP systems has the capacity to provide large efficiency savings.

2. Product and service design: E-commerce has the capacity to improve the quality of product design, reduce design time-scales and fundamentally improve the interaction between designers, engineers, suppliers and manufacturing.

3. Manufacturing: E-commerce solutions will also have an impact on manufacturing as companies are required to be more flexible and responsive in what they make and in the levels of mass customization that manufacturing systems can deliver. E-commerce can help manufacturing become more flexible and responsive, and ensure demand and supply planning are more effective.

4. Demand and supply planning: Most people find it difficult to cope with planning when it involves more than a few variables. This is an area where computers, statistics and e-commerce will always be more capable – if they are used in the right way. Demand and supply planning systems are increasingly using e-commerce alongside their traditional software applications to improve the effectiveness of planning solutions. E-commerce is also expected to allow much greater interaction between the planning systems

in areas such as collaborative forecasting and replenishment (CPFR) and e-marketplaces.

5. Fulfilment and e-fulfilment: Fulfilment remains an area of great promise for e-commerce solutions, but one that has largely underperformed its potential. E-commerce has the capacity through information, such as tracking and tracing, to revolutionize the way that goods and services are delivered. It has the capacity to virtualize inventory and to change fundamentally the relationship between end customers, retailers, wholesalers and manufacturers.

6. Service and support: Service and support is another area where e-commerce has made some impact but there is still potential for greater change. E-commerce has the capacity to transform the effectiveness of field service forces and to change the way that returns and repairs are managed. Like fulfilment, this is an area where the value proposition will drive radical change, but it will take time.

7. E-working: E-working is an area that will have a more immediate impact on the supply chain. Most companies have already given thousands of their workers access to intranets and the Internet. They have given them e-working tools such as employee portals, knowledge management systems and computer-based training. Through e-mail they have revolutionized the way in which people work across boundaries of time and space. E-working capabilities have a significant impact on the working of supply chains and on the ability of employees to manage complex events and issues in the supply chain.

E-commerce technology provides information visibility through out the supply chain. The integration of production planning, scheduling, and inventory control with procurement process makes the loop complete. Because of information visibility, suppliers could possess the information of

customer demands, in the mean time, customers can receive faster feedback of transaction status from their suppliers. Such strong impact causes companies to incorporate the information visibility into their competitive advantage.

## **TOPIC 5. INFORMATION MANAGEMENT FOR EFFECTIVE E-COMMERCE BUILDING THROUGH INTRANET AND EXTRANET**

5.1. Basic principles of Intranet functioning.

5.2. Extranet and its security issues.

### ***5.1. Basic principles of Intranet functioning.***

An Intranet is a private network, accessible only to an organization's staff. Generally a wide range of information and services from the organization's internal IT systems are available that would not be available to the public from the Internet. A company-wide Intranet can constitute an important focal point of internal communication and collaboration, and provide a single starting point to access internal and external resources. In its simplest form an Intranet is established with the technologies for local area networks (LANs) and wide area networks (WANs).

Intranets began to appear in a range of larger organizations from 1994 that was true prehistory from an IT systems point of view. Intranet history is bound up with the development of Internet – the global network. The idea of WWW, proposed in 1989 by Tim Berners-Lee and others, which aim was to enable the connection and access to many various sources, became the prototype for the first internal networks. The goal of Intranet invention was to

increase employees productivity through the easier access to documents, their faster circulation and more effective communication. Although, access to information was always a crucial matter, in fact, Intranet offered lots more functionalities, i.e.: e-mail, group work support, audio-video communication, texts or personal data searching.

The first Intranet software solutions were simply static websites that allowed employees to access information in a central location, using nothing more than a web browser. In 1996, Frontier Technologies introduced a product called “Intranet Genie” which was a bundle of applications that supported document sharing, employee discussions, electronic messaging and a variety of related tools designed to facilitate communication. Since the introduction of the Intranet Genie product, over the last seventeen years, a variety of Intranet software products have come to the market with the goal of providing similar services to businesses. At some point during this time, the term “Intranet” became synonymous for content served via a web server and consumed via a browser, rather than for a suite of applications and services such as what was provided by the Intranet Genie product.

The Intranet Genie was very different from the Intranet products of today, in fact it wasn't even a web site, but rather a client server application that consisted of both server software as well as a collection of software components installed on each client computer. These client applications allowed users to share documents, participate in online discussions, and to exchange secure email. The popularity of the world wide web spurred a major change in how Intranet software was used by companies. Intranet software products evolved to operate as web portals, which greatly simplified their installation and management, since the only client software required was a common web browser. In 1999 Intranet Connections, one of the first web

based Intranet software products to come to market, was born. The evolution from client-server to web based solution reduced the cost of both development and implementation of Intranet products and would spur their future success in the marketplace.

The most recent evolution involves the integration of social features into Intranet products. The success and popularity of social networking platforms such as Facebook, Twitter and LinkedIn have ushered in a new era of Internet Software usage which allows users to communicate a wide variety of information both quickly and easily. In response to the popularity of social networking, Intranet products have evolved to include social networking features that allow for simple communication between the employees within a business. Intranet Connections includes many social networking features such as wall posts, the ability for employees to follow one another and instant chat functionality. These social features provide a gateway to the future of Intranet products by allowing users to interact with them in the same way they are used to doing so with personal social networks outside of work.

***Intranet has some peculiarities. They are:***

- An Intranet is a computer network that uses Internet Protocol technology to share information, operational systems, or computing services within an organization. This term is used in contrast to Extranet, a network between organizations, and instead refers to a network within an organization.
- The objective is to organize each individual's desktop with minimal cost, time and effort to be more productive, cost efficient, timely, and competitive.
- An Intranet may host multiple private websites and constitute an important component and focal point of internal communication and collaboration.

- Any of the well known Internet protocols may be found in an Intranet, such as HTTP (web services), SMTP (e-mail), and FTP (file transfer protocol). Internet technologies are often deployed to provide modern interfaces to legacy information systems hosting corporate data.

### *Uses of Intranet:*

- Increasingly, Intranets are being used to deliver tools, e.g. collaboration (to facilitate working in groups and teleconferencing) or sophisticated corporate directories, sales and customer relationship management tools, project management etc., to advance productivity.

- Intranets are also being used as corporate culture-change platforms. For example, large numbers of employees discussing key issues in an Intranet forum application could lead to new ideas in management, productivity, quality, and other corporate issues.

- In large Intranets, website traffic is often similar to public website traffic and can be better understood by using web metrics software to track overall activity. User surveys also improve Intranet website effectiveness. Larger businesses allow users within their Intranet to access public Internet through firewall servers. They have the ability to screen messages coming and going keeping security intact.

- When part of an Intranet is made accessible to customers and others outside the business, that part becomes part of an Extranet. Businesses can send private messages through the public network, using special encryption/decryption and other security safeguards to connect one part of their Intranet to another.

- Intranet user-experience, editorial, and technology teams work together to produce in-house sites. Most commonly, Intranets are managed by the

communications, HR or CIO departments of large organizations, or some combination of these.

- Because of the scope and variety of content and the number of system interfaces, Intranets of many organizations are much more complex than their respective public websites. Intranets and their use are growing rapidly.

Leaving aside comfort and level of employees satisfaction, the natural effect of implementation and improvement of Enterprise Search solutions is financial benefit. Contrary to popular belief, investments profits and savings from reaching the information faster are completely countable. Preparing such calculations is not pretty easy. The first step is: to estimate time, which is spent by employees on searching for information, to calculate what percentage of quests end in a fiasco and how long does it take to perform a task without necessary materials. It should be pointed out that findings of such companies as IDC or AIIM shows that office workers set aside at least 15-35% of their working hours for searching necessary information.

Intranet has become a comprehensive tool used for companies goals accomplishment. It supports employees commitment and effectiveness, internal communication and knowledge sharing. However, its main task is to find information, which is often hide in stack of documents or dispersed among various data sources. Equipped with search engine, Intranet has become invaluable working tool practically in all sectors, especially in specific departments as customer service or administration.

***There are three major technologies (or approaches) to build an Intranet:***

1. Enterprise portals - is an adaptation of traditional Internet websites to access information and coordination within the enterprise.

2. ECM system (*Enterprise Content Management*) - is the result of document management systems. These systems are primarily focused on the management of corporate content access.

3. Social networks - a popular social adaptation services for business. These systems are focused on building social relationships between employees within the company.

An “*Intranet portal*” is the gateway that unifies access to enterprise information and applications on an Intranet. It is a tool that helps a company manage its data, applications, and information more easily, and through personalized views. Some portal solutions today are able to integrate legacy applications, objects from other portals, and handle thousands of user requests. In a corporate enterprise environment, it is also known as an *enterprise portal*.

Intranet Portals can be a large business cost. The maintenance and management can be time consuming and expensive. Not only is it a cost to keep the portal running but a cost when the system goes offline. Most Intranets are established to put all an organization's resources into one place and having that offline can force operations to be put on hold.

Security issues can become an ongoing problem. Unauthorized access is a concern and can result in users gaining access to sensitive information. Denial of access can cause issues for users needing access for their work.

***Intranets advantages:***

*Workforce productivity:* Intranets can help users to locate and view information faster and use applications relevant to their roles and responsibilities. With the help of a web browser interface, users can access data held in any database the organization wants to make available, anytime and — subject to security provisions — from anywhere within the company

workstations, increasing employees' ability to perform their jobs faster, more accurately, and with confidence that they have the right information.

*Time:* Intranets allow organizations to distribute information to employees on an as-needed basis; Employees may link to relevant information at their convenience, rather than being distracted indiscriminately by email.

*Communication:* Intranets can serve as powerful tools for communication within an organization, vertically strategic initiatives that have a global reach throughout the organization. By providing this information on the Intranet, staff have the opportunity to keep up-to-date with the strategic focus of the organization. Some examples of communication would be chat, email, and/or blogs. A great real world example of where an Intranet helped a company communicate is when Nestle had a number of food processing plants in Scandinavia. Their central support system had to deal with a number of queries every day.

*Web publishing:* allows cumbersome corporate knowledge to be maintained and easily accessed throughout the company using hypermedia and Web technologies. Examples include: employee manuals, benefits documents, company policies, business standards, news feeds, and even training, can be accessed using common Internet standards (Acrobat files, Flash files, CGI applications). Because each business unit can update the online copy of a document, the most recent version is usually available to employees using the Intranet.

*Business operations and management:* Intranets are also being used as a platform for developing and deploying applications to support business operations and decisions across the Internetworked enterprise.

*Cost-effective:* Users can view information and data via web-browser rather than maintaining physical documents such as procedure manuals,

internal phone list and requisition forms. This can potentially save the business money on printing, duplicating documents, and the environment as well as document maintenance overhead.

*Enhance collaboration:* Information is easily accessible by all authorised users, which enables teamwork.

*Cross-platform capability:* Standards-compliant web browsers are available for Windows, Mac, and UNIX.

*Built for one audience:* Many companies dictate computer specifications which, in turn, may allow Intranet developers to write applications that only have to work on one browser (no cross-browser compatibility issues).

*Promote common corporate culture:* Every user has the ability to view the same information within the Intranet.

*Immediate updates:* When dealing with the public in any capacity, laws, specifications, and parameters can change. Intranets make it possible to provide your audience with "live" changes so they are kept up-to-date, which can limit a company's liability.

*Supports a distributed computing architecture:* The Intranet can also be linked to a company's management information system, for example a time keeping system.

***Potential disadvantages of Intranets:***

- it is an evolving technology that requires upgrades and can have software incompatibility problems
- security features can be inadequate
- inadequate system performance management and poor user support
- may not scale up adequately
- maintaining content can be time consuming
- some employees may not have PCs at their desks

- The aims of the organisation in developing an Intranet may not align with user needs.

### *Similarities of Internet and Intranet*

- Intranet uses the Internet protocols such as TCP/IP and FTP.
- Intranet sites are accessible via web browser in similar way as websites in Internet. But only members of Intranet network can access Intranet hosted sites.

- In Intranet, own instant messengers can be used as similar to yahoo messenger/ gtalk over the Internet.

Modern Intranet products, such as Intranet Connections, have evolved into platforms that are beneficial to businesses in a variety of ways. They assist employees in working more effectively by allowing them to easily share and communicate information with one another in a simple and intuitive manner. They ensure time is not wasted searching for important information and that complex business processes and workflow are captured in ways that ensure they are always followed correctly. Corporate culture is also easily promoted through the ability to theme the Intranet in alignment with the company's brand and image

### ***5.2. Extranet and its security issues***

An ***Extranet*** is a website that allows controlled access to partners, vendors and suppliers or an authorized set of customers - normally to a subset of the information accessible from an organization's Intranet. An Extranet provides access to needed services for authorised parties, without granting access to an organization's entire network. Historically the term was occasionally also used in the sense of two organisations sharing their internal networks over a virtual private network (VPN).

Extranets first appeared within a year of the creation of Intranets, around 1995. Like Intranets, early Extranets were initially available only to large corporations, which used the technology to provide customers and suppliers with access to the company's network. Libraries soon adopted the technology. The first states to use library Extranets included Alaska, Colorado, Oregon, Rhode Island and Utah.

In the summer of 1996, IBM brought the term “Extranet” to public attention when it used an Extranet system to distribute information at the Atlanta Olympic games. Extranets allowed for the creation of the Virtual Private Networks, a type of Extranet that uses public network protocols to allow networked communication among authorized organizations. As mid-sized business gained access to Extranet technology, they began to divide these networks into two basic categories: business-to-business and business-to-consumer. The former isolates the Extranet from all other Internet users while the latter allows a single authorized server to communicate with previously unknown customers online.

Extranets are used much in the same way as Intranets, except that they can be accessed remotely. An organization could use an Extranet, for example, as a way to exchange large files between the organization and an outside contractor. All the outside contractor would need would be a password, so that they can access the Extranet from the Internet.

Extranets can be used to make a limited part of an organization's Intranet available to external partners. However it is important to be clear to staff which content is shared with external partners and which is only available internally via the Intranet, so that your staff can be sure not to accidentally share material that should not be shared with external partners. If you contribute content with links to other parts of the Intranet/Extranet it is

important to use "relative" links so that they will work in either the Intranet or Extranet.

### *Extranet Security Issues*

Because of the commercially-sensitive nature of the information exchanged within an Extranet, each system must be buffered with appropriate security technology. Security is required at two levels: First, you must control who you let into your Extranet; second, you've got to be able to control what resources they can access. After all, today's collaborator may be tomorrow's competitor. Moreover, there's the threat of opening system to malicious mischief and to a more organized attack by people searching for company secrets.

While specific requirements vary from system to system, GE security experts have learned four universal lessons in the course of implementing corporate Extranets:

1. make security a priority in the early planning stages
2. analyze the security risks, as well as the value of the information being published
3. apply the correct level of authentication and encryption technology
4. limit access from inside and outside the system.

Authentication software manages and controls user access to the system. Extranets that are free of sensitive data can use a traditional user-name-and-password system to authenticate users. If more privacy is required, then the Secure Sockets Layer (SSL) protocol should be employed to encrypt all information as it passes over the Internet. In addition, digital certificates can be used, instead of the traditional user-name-and-password system, to authenticate users. A digital certificate is an electronic document that

identifies a user's identity by a trusted third party. This security methodology is often referred to as Public Key Infrastructure (PKI).

Encryption software encodes and decodes information in order to protect the confidentiality of the Extranet's data. In addition to encrypting information as it is transmitted over the Internet, it may also be necessary to encrypt data as it resides on the system. A database of credit card numbers is a good example of information that needs to be carefully protected through encryption.

In many current Extranet deployments, the major architectural components consist of web services (the presentation layer), specific application services (such as customer relationship management and enterprise resource planning applications, search and indexing services, etc.) and back-end components such as databases and Active Directory servers.

The two pivotal security functions that should be designed within an Extranet are authentication and authorization:

- Authentication is the process through which a user provides credentials that definitively identify him/her as a legitimate user. These can be integrated with numerous other factors, as will be covered later.

- Authorization is the determination of what role(s) a user may possess after being successfully authenticated and what privileges and actions are permissible within the role definition(s). It may also include dynamic factors such as level of risk when granting permissions.

Authentication is often left to whatever native methods are in place within the environment (such as LDAP or Active Directory lookups), and all authorization decisions reside within the individual applications. In addition, some organizations have integrated services like SharePoint and others with single sign-on (SSO) solutions that manage credentials for multiple services

and integrate with user repositories. There are, however, a number of shortcomings with this traditional approach that can create problems in large enterprise Extranet deployments.

Here are some examples:

- With many users accessing the Extranet from multiple locations, simple usernames and passwords are no longer adequate. Additional access management controls, such as evaluating contextual data (location and computer used to access), are needed to prevent fraud.

- With multiple types of users needing different levels of access to a wide variety of data via the Extranet, defining roles and privileges in a secure fashion is difficult. When this task is left to the individual applications, the roles that can be defined are often not granular enough. Management of multiple role-based systems is tedious, so for convenience, users are often given permission to all resources or to groups that include data types they shouldn't have access to.

- Lack of support for existing user data stores raises the costs and time needed to manage user identities. Services and applications leveraging these stores would also have to be modified. Access management and authorization systems need to integrate with existing user directory stores such as Lightweight Directory Access Protocol (LDAP) and Active Directory (AD). In addition, they should support current and developing standards such as XACML (Extensible Access Control Markup Language) for externalizing authorization controls from applications.

- Many authentication schemes lack detailed audit trails. Auditors are closely scrutinizing access to resources covered by policies and compliance specifications. They need to see audit trails that clearly demonstrate which

users access which resources, along with the authorization decisions and actions behind their access controls.

Building and maintaining an Extranet can be a taxing undertaking. It requires a different mix of skills than those required for operating a company's internal Intranet.

Such skills include:

- the ability to target the internal business processes that most readily lend themselves to Extranet technology
- expertise in developing Extranet applications that address specific business processes
- a track record of creating the custom software necessary to link an Extranet with a company's internal systems and those of outside trading partners
- experience in managing large (and often global) electronic trading communities

Some companies have the resources and knowledge to handle the challenges of an Extranet without straining their information technology (IT) staff or diverting resources from current business systems. However, many companies find their best option for guaranteeing the fastest and fullest return on investment is to outsource to a partner with a proven methodology for building and maintaining effective Extranet communities.

Extranets offer companies an almost unlimited means to expand and enrich their electronic commerce activities. Traditional electronic commerce has been taking place over private VANs for more than 20 years, mostly in the form of Electronic Data Interchange (EDI) transactions. EDI documents such as purchase orders, planning schedules and invoices give large companies an excellent way to eliminate the paperwork associated with high-volume, highly

structured transactions with key suppliers. However, traditional EDI has its limitations. EDI transactions need to be transmitted in rigid, structured data formats that are suitable for only a few kinds of business documents. EDI is also a computer-to-computer technology that is processed in batches. It was not designed to handle interactive and collaborative business processes. Thus, EDI alone is incapable of streamlining many processes that take place between trading partners.

Extranets, on the other hand, exploit open standard Internet technology that enables businesses to collaborate on-line by exchanging content-rich, multimedia documents (with graphics, sound, and video), as well as traditional electronic commerce transactions. Extranets also open avenues for reaching new trading partners and for reducing routine paperwork with smaller suppliers, distributors and customers. That's because Extranets are built on Internet technologies that are affordable and available to businesses across the globe. Designated trading partners can access a company's Extranet, for example, using their own personal computers, standard Web browser software and Internet access providers.

Since the old and new technologies each have their advantages, most companies will rely on a mix of both in their electronic commerce programs, at least for the short term.

Companies with established Extranets are using them specifically to:

- share sales data and planning information interactively with suppliers to ensure the right product is available at the right time for customers;
- facilitate programs with suppliers that boost productivity, such as just-in-time manufacturing and vendor-managed inventory;
- enhance supplier performance through initiatives such as supplier score cards;

- speed new products to market by collaborating on-line with outside business partners;
- communicate product changes, promotions and inventory information instantaneously with distributors to boost competitiveness;
- develop new corporate sales channels across the globe to increase revenues;
- enhance customer satisfaction by initiating and tracking shipments on-line with logistics providers;
- improve cash flow by sending and receiving payments via electronic funds transfers from financial institutions;
- automate key activities with suppliers, from the moment an order is placed all the way through delivery and final payment

One common misconception about Extranets is that corporate IT staffs can extend their Intranets to external trading partners with relative ease. This is not the case — Extranets are different entities from Intranets. With an Extranet, an IT staff not only has to manage its own in-house environment, but also all the complexities of networking with outside companies and supporting external users. Web applications must be developed in cooperation with trading partners in order to support inter-company processes. Extranets must also be built with multi-layered and robust security features, and those features must be managed on an ongoing basis in order to shield commercially sensitive information from competitors. Forrester Research analysts recently synthesized the experiences of 50 companies that had deployed these systems. Some 30 percent of companies surveyed said the biggest barrier to launching their Extranets was the technology, for example, the process of connecting legacy systems and equipping the Extranet with the necessary security

### ***Advantages of Extranet:***

- Exchange large volumes of data using Electronic Data Interchange (EDI)
- Share product catalogs exclusively with trade partners
- Collaborate with other companies on joint development efforts
- Jointly develop and use training programs with other companies
- Provide or access services provided by one company to a group of other companies, such as an online banking application managed by one company on behalf of affiliated banks

### ***Disadvantages:***

- Extranets can be expensive to implement and maintain within an organization (e.g., hardware, software, employee training costs), if hosted internally rather than by an application service provider.
- Security of Extranets can be a concern when hosting has valuable or proprietary information.

For small projects in which security isn't an overriding concern, there are simpler choices than Extranets. Extranet alternative is "*virtual offices*", which simplifies communication and collaboration with others of your choosing. Vendors are aiming these services at small businesses and workgroups within organizations, which makes these virtual offices pocket Extranets.

### ***Difference between Internet, Intranet and Extranet***

- When it comes to size of the network, Internet is the largest and consists hundreds of thousands of network devices and interconnections. Intranet size may span from hundreds to several thousands of computers. Extranet comes as a part of Intranet, so it is the smallest.
- Internet is a public network. Intranet and Extranet are private networks.

- Users can access Internet anonymously. Users should have valid username/password to access Intranet and Extranet.

- Generally, Internet is unregulated and uncensored. But Intranet/Extranet is regulated by the organization policies.

- In the nature of users, Internet has unlimited number of anonymous users. Intranet keeps limited number of predefined users who are internal members of the organization. Extranet users are mostly non-organizational users.

Computer networks differ from each other depending on their topology. Each type of network has its own characteristics which provide desired level of service to the audience. There are three comprehensive types of networks, Internet, Intranet and Extranet. Each network shares same communication technologies. They differ in terms of size, access levels and the nature of users.

### **Intranet**

Intranet is a “Private network” with a limited number of computers interconnected and controlled in a defined manner. Intranet is setup and controlled by an organization, to ensure secure and uninterrupted connection between members to exchange information more efficiently. Organization requirements may include sharing latest news updates, management information, organization changes, new policies and procedures etc.

Intranet is much like the Internet, but it is isolated from the external world. Firewalls are used to connect Intranet to the outside world when it has to be connected to Internet. It uses same protocols like TCP/IP. Size of the Intranet depends on the organization requirements. It may span over one building, one area, or one country. In addition, there are many multinational organizations maintain Intranets between countries using dedicated fiber optic

connections. Communication efficiency between network devices is high since the bandwidth is fully assigned to a fixed number of users. There are no frequent traffic spikes, channel breakdowns or server offline situations in the Intranet. Intranet may be accessible through the Internet. There are techniques like VPN connection to provide secure connections in such situations.

### **Internet**

Internet is a “Public network” with thousands of computers (servers and clients) interconnected to share information. Clusters of computer networks are interconnected to build the network spanning all over the world. There is no centralized controller to control communication. It relies on network devices and protocols (Ex routing protocols) previously agreed upon. Any user can access Internet through an Internet Service Provider (ISP). Generally, Internet is unregulated and uncensored, but there are some countries with restrictions imposed on Internet access to their citizen. Although there is no centralized entity to control, ICANN (The Internet Corporation for Assigned names and Numbers) manages Internet Protocol Addresses and Domain Names.

### **Extranet**

Extranet is part of an Intranet, which is also categorized as a “Private Network”. It is controlled and managed by an organization, to provide secure access to Intranet from the outside world. Many business organizations need their business partners and customers to connect to Intranet to enhance communication and efficiency. Since the Intranet permits only internal members to gain access, external members (partners and customers) use Extranet to access the network. System administration/management can decide which users should allow through Extranet. Generally, external users are given limited access over the Intranet.

Not only external users, but sometimes members of the organization itself who may need to access the network over the Internet can use Extranet.

## **TOPIC 6. ELECTRONIC PAYMENT SYSTEMS**

6.1. Electronic payment systems.

6.2. Primary classification of payment systems.

### ***6.1. Electronic payment systems***

In the early 1990s the business and consumer world encountered a new way of conducting trade business, which was named electronic commerce (e-commerce). Over the years electronic commerce has evolved into a popular and acknowledged way of conducting business. In an e-commerce environment, payments take the form of money exchange in an electronic form, and are therefore called electronic payments. Electronic payments are an integral part of e-commerce and are one of its most critical aspects.

A *payment system* is any system used to settle financial transactions through the transfer of monetary value, and includes the institutions, instruments, people, rules, procedures, standards, and technologies that make such an exchange possible. A common type of payment system is the operational network that links bank accounts and provides for monetary exchange using bank deposits.

Traditional payment systems are negotiable instruments such as drafts (e.g., checks) and documentary credits such as letters of credit. With the advent of computers and electronic communications a large number of

alternative electronic payment systems have emerged. These include debit cards, credit cards, electronic funds transfers, direct credits, direct debits, internet banking and e-commerce payment systems. Some payment systems include credit mechanisms, but that is essentially a different aspect of payment. Payment systems are used in lieu of tendering cash in domestic and international transactions and consist of a major service provided by banks and other financial institutions.

*E-commerce payment system* facilitates the acceptance of electronic payment for online transactions.

Today, many users make payments electronically.

*Electronic Payment* is a financial exchange that takes place online between buyers and sellers. The content of this exchange is usually some form of digital financial instrument (such as encrypted credit card numbers, electronic cheques or digital cash) that is backed by a bank or an intermediary, or by a legal tender.

*Electronic bill payment* is a feature of online, mobile and telephone banking, similar in its effect to a giro, allowing a customer of a financial institution to transfer money from their transaction or credit card account to a creditor or vendorsuch as a public utility, department store or an individual to be credited against a specific account. These payments are typically executed electronically as a direct deposit through a national payment system, operated by the banks or in conjunction with the government. Payment are typically initiated by the payer but can also be set up as a direct debit.

Generally defined, electronic payment is a form of a financial exchange that takes place between the buyer and seller facilitated by means of electronic communications. An e-commerce electronic payment is a financial exchange that takes place in online environment.

In addition to the bill payment facility most banks will also offer various features with their electronic bill payment systems. These include the ability to schedule payments in advance to be made on a specified date (convenient for instalments such as mortgage and support payments), to save the biller information for reuse at a future time and various options for searching the recent payment history. In many cases the payment data can also be downloaded and posted directly into the customer's accounting or personal finance software.

Payment systems may be physical or electronic and each has its own procedures and protocols. Standardization has allowed some of these systems and networks to grow to a global scale, but there are still many country- and product-specific systems.

A secure electronic financial transaction has to meet the following four requirements: ensure that communications are private; verify that the communications have not been changed in transmission; ensure that the client and server are who each claims to be; and ensure that the data to be transferred was, in fact, generated by the signed author.

To meet these objectives, every developed electronic payment system depends on some type of encryption and/or utilization of digital certificates. Using an encryption algorithm, the plaintext (also known as the original text) is changed into ciphertext, which is decrypted by the receiver and transformed into clear-text. The encryption algorithm utilizes a key, a binary number often ranging in length from 40 to 128 bits. After being encrypted, the information is considered to be coded and therefore “locked.” The recipient uses another key to “unlock” the coded information, restoring it to its original binary form.

Two cryptographic methods used in electronic payment systems include the secret key (which uses the same key to encrypt and decrypt and is the

fastest method; however, in the initial transmission to the recipient, the secret key is not secure) and the public key (which uses both a private and a public key).

End user acceptance of such sensitive technology as money-circulating payment systems is the critical key aspect of the whole path of payment systems' establishment. Without such acceptance no technology can successfully exist on the market, and payment systems are not an exception.

The process of paying is an essential part of customers' online buying activities. These activities are well described by the Consumer Mercantile Activities Model. The model comprises prepurchase interaction, purchase consummation and postpurchase interaction phases. The purchase consummation phase specifies the flow of information and documents associated with purchasing and negotiating with merchants for suitable terms, such as price, availability, and delivery dates; and electronic payment mechanisms that integrate payment into the purchasing process.

The buyer arrives to payment activities after identifying products of services to be purchased. The buyer and seller conduct then a mercantile transaction. In a mercantile transaction the buyer and the seller exchange information followed by the necessary payment. The payment methods they use should be mutually negotiated and agreed on (ibid). Therefore, in order to conduct a successful e-commerce mercantile transaction the buyer should at least be willing to use the payment method offered by merchants. From this viewpoint, user acceptance of e-commerce electronic payment systems is critical for the completion of the purchase consummation phase and the whole purchasing process. It can be therefore observed that the payment process and the user involvement in it are highly important for e-commerce activities.

## ***6.2. Primary classification of payment systems***

The principal classification of EPSs (electronic payment systems) is based on the form of money representation and the principle of money transfer. Existing payment systems can be divided into two groups: electronic cash mechanisms (or electronic currency) and credit-debit systems. Electronic cash resembles conventional cash, when parties exchange electronic tokens that represent value, just as banknotes and coins determine the nominal value of conventional cash money. The credit-debit approach in the context of electronic payments means that money is represented by records in bank accounts, and this information is electronically transferred between parties over computer networks.

In the group of account-based systems, one can distinguish between

- 1) generic online EPSs that use simple account-based model for serving Internet payments,
- 2) systems that use the debit and credit cards model, and
- 3) specialized payment systems that, for instance, were designed for trading content online such as music. Some researchers consider credit cards systems as a separate group of payment models, others consider them to be a variant of the credit-debit type.

Electronic payment systems are generally classified into four categories:

- credit card and debit cards;
- electronic cash;
- micropayment systems;
- session-level protocols for secure communications.

*Credit Card.* The idea of lending money through a card goes as far back as the 1800s. According to the 2005 FDIC Banking Review's paper called "Overview of Recent Developments in the Credit Card Industry", merchants

and financial intermediaries provided credit for agricultural and durable goods. The cards soon began to spread to other industries. Hotels and department stores presented their most valued customers with paper identification cards.

It wasn't until the late 1950s that Bank of America (introduced the BankAmericard), the first general purpose credit card. The bank created a separate credit card operation entity that in the mid 1970s became known as VISA. In 1966, competing banks spawned rival cards as a result of Bank of America's success. This network of bank owners later created an association that came to be known as MasterCard.

Throughout the years, the credit card industry has been the subject of much debate. On the one hand, many critics have blamed credit card issuers' loose restrictions for high fees and rates, which are often hidden in complex credit agreements. The deregulation of the industry that occurred in 1970s and 1980s is often blamed for this.

Payment using credit card is one of most common mode of electronic payment today. Credit card is a small plastic card with a unique number attached with an account. It has also a magnetic strip embedded in it which is used to read credit card via card readers. When a customer purchases a product via credit card, credit card issuer bank pays on behalf of the customer and customer has a certain time period after which he/she can pay the credit card bill. It is usually credit card monthly payment cycle. Following are the actors in the credit card system.

- The card holder - Customer
- The merchant - seller of product who can accept credit card payments.
- The card issuer bank - card holder's bank
- The acquirer bank - the merchant's bank

- The card brand - for example, visa or mastercard.

*Debit Card.* Debit card, like credit card is a small plastic card with a unique number mapped with the bank account number. It is required to have a bank account before getting a debit card from the bank. The major difference between debit card and credit card is that in case of payment through debit card, amount gets deducted from card's bank account immediately and there should be sufficient balance in bank account for the transaction to get completed. Whereas in case of credit card there is no such compulsion.

Debit cards free customer to carry cash, cheques and even merchants accepts debit card more readily. Having restriction on amount being in bank account also helps customer to keep a check on his/her spendings.

In many countries, the use of debit cards has become so widespread that their volume has overtaken or entirely replaced cheques and, in some instances, cash transactions. The development of debit cards, unlike credit cards and charge cards, has generally been country specific resulting in a number of different systems around the world, which were often incompatible. Since the mid-2000s, a number of initiatives have allowed debit cards issued in one country to be used in other countries and allowed their use for Internet and phone purchases.

There are currently three ways that debit card transactions are processed: **EFTPOS** (also known as *online debit* or *PIN debit*), **offline debit** (also known as *signature debit*) and the **Electronic Purse Card System**. One physical card can include the functions of all three types, so that it can be used in a number of different circumstances.

Although many debit cards are of the Visa or MasterCard brand, there are many other types of debit card, each accepted only within a particular country

or region, for example Switch (now: Maestro) and Solo in the United Kingdom, Interac in Canada, Carte Bleue in France, EC electronic cash (formerly Eurocheque) in Germany, UnionPay in China, RuPay in India and EFTPOS cards in Australia and New Zealand. The need for cross-border compatibility and the advent of the euro recently led to many of these card networks (such as Switzerland's "EC direkt", Austria's "Bankomatkasse" and Switch in the United Kingdom) being re-branded with the internationally recognised Maestro logo, which is part of the MasterCard brand. Some debit cards are dual branded with the logo of the (former) national card as well as Maestro (for example, EC cards in Germany, Switch and Solo in the UK, Pinpas cards in the Netherlands, Bancontact cards in Belgium, etc.). The use of a debit card system allows operators to package their product more effectively while monitoring customer spending.

#### *Online debit system*

Online debit cards require electronic authorization of every transaction and the debits are reflected in the user's account immediately. The transaction may be additionally secured with the personal identification number (PIN) authentication system; some online cards require such authentication for every transaction, essentially becoming enhanced automatic teller machine (ATM) cards.

One difficulty with using online debit cards is the necessity of an electronic authorization device at the point of sale (POS) and sometimes also a separate PINpad to enter the PIN, although this is becoming commonplace for all card transactions in many countries.

Overall, the online debit card is generally viewed as superior to the offline debit card because of its more secure authentication system and live status, which alleviates problems with processing lag on transactions that may

only issue online debit cards. Some on-line debit systems are using the normal authentication processes of Internet banking to provide real-time on-line debit transactions.

#### *Offline debit system*

Offline debit cards have the logos of major credit cards (for example, Visa or MasterCard) or major debit cards (for example, Maestro in the United Kingdom and other countries, but not the United States) and are used at the point of sale like a credit card (with payer's signature). This type of debit card may be subject to a daily limit, and/or a maximum limit equal to the current/checking account balance from which it draws funds. Transactions conducted with offline debit cards require 2–3 days to be reflected on users' account balances.

In some countries and with some banks and merchant service organizations, a "credit" or offline debit transaction is without cost to the purchaser beyond the face value of the transaction, while a fee may be charged for a "debit" or online debit transaction (although it is often absorbed by the retailer). Other differences are that online debit purchasers may opt to withdraw cash in addition to the amount of the debit purchase (if the merchant supports that functionality); also, from the merchant's standpoint, the merchant pays lower fees on online debit transaction as compared to "credit" (offline)

#### *Electronic purse card system*

Smart-card-based electronic purse systems (in which value is stored on the card chip, not in an externally recorded account, so that machines accepting the card need no network connectivity) are in use throughout Europe since the mid-1990s, most notably in Germany (Geldkarte), Austria (Quick Wertkarte), the Netherlands (Chipknip), Belgium (Proton), Switzerland (CASH) and France (Moneo, which is usually carried by a debit

card). In Austria and Germany, almost all current bank cards now include electronic purses, whereas the electronic purse has been recently phased out in the Netherlands.

Debit cards may also be used on the Internet either with or without using a PIN. Internet transactions may be conducted in either online or offline mode, although shops accepting online-only cards are rare in some countries (such as Sweden), while they are common in other countries (such as the Netherlands). For a comparison, PayPal offers the customer to use an online-only Maestro card if the customer enters a Dutch address of residence, but not if the same customer enters a Swedish address of residence.

Internet purchases can be authenticated by the consumer entering their PIN if the merchant has enabled a secure online PIN pad, in which case the transaction is conducted in debit mode. Otherwise, transactions may be conducted in either credit or debit mode (which is sometimes, but not always, indicated on the receipt), and this has nothing to do with whether the transaction was conducted in online or offline mode, since both credit and debit transactions may be conducted in both modes.

In some countries, banks tend to levy a small fee for each debit card transaction. In some countries (for example, the UK) the merchants bear all the costs and customers are not charged. There are many people who routinely use debit cards for all transactions, no matter how small. Some (small) retailers refuse to accept debit cards for small transactions, where paying the transaction fee would absorb the profit margin on the sale, making the transaction uneconomic for the retailer.

*Smart Card.* Smart card is again similar to credit card and debit card in appearance but it has a small microprocessor chip embedded in it. It has the capacity to store customer work related/personal information. Smart card is

also used to store money which is reduced as per usage. Smartcard is similar to a credit card; however it contains an embedded 8-bit microprocessor and uses electronic cash which transfers from the consumers' card to the sellers' device. A popular smartcard initiative is the VISA Smartcard. Using the VISA Smartcard you can transfer electronic cash to your card from your bank account, and you can then use your card at various retailers and on the internet.

Smart card can be accessed only using a PIN of customer. Smart cards store information in encrypted format. Mondex and Visa Cash cards are examples of smart cards.

#### *Disadvantages of smart cards*

The biggest problem facing smart cards is security and the problem is two fold. The first issue is that not all smart cards are in fact secure. VISA and MasterCard developed a new standard, SET, in early 1996 in an attempt to get the entire industry on a standard of encryption. Additionally, there are standards such as DES which have been around for years, usable in all forms of encryption which are being used in smart cards. But still some smart cards are not inviolate. Mondex, a maker of banking smart cards, solves this problem by making its transactions possible only between Mondex cards. But in order for smart cards to reach their full potential, they must be able to interact with a host of interfaces. And they must do so securely.

The second issue with security involves public perception of the technology. And once people are comfortable that the card is secure, they must still be confident that somebody isn't somewhere collecting and analyzing all of the information gleaned from the smart cards' use.

A third issue concerns who holds responsibility for the card. If the cash balance is wiped clean by a memory failure, who is liable, the person or the

bank? If a transaction is not recorded, where are the lines drawn? Currently companies have begun to write out agreements in order to draw boundaries, but these will have to be ones which consumers are comfortable with in order for people to begin to use smart cards.

The final problem which smart cards will face in their move to diffuse extensively involves product complements. While smart cards themselves are fairly cheap, card readers are not (costing between \$50 and \$200).

*Electronic Money* (also e-cash, also digital cash) is an electronic store of monetary value on a technical device that may be widely used for making payments. *E-Money* is money which exists only in banking computer systems and is not held in any physical form. The device acts as a prepaid bearer instrument which does not necessarily involve bank accounts in transactions.

E-Money Refers to several systems which enable a buyer to pay electronically by transmitting a unique number (called digital certificate) similar to a banknote number. Unlike credit card payments where the identity of the buyer can be established, digital cash (just like real cash) is anonymous. Also called electronic cash or electronic money.

E-Money transactions refers to situation where payment is done over the network and amount gets transferred from one financial body to another financial body without any involvement of a middleman.

Online payments done via credit card, debit card or smart card are examples of e-money transactions. Another popular example is e-cash. In case of e-cash, both customer and merchant both have to sign up with the bank or company issuing e-cash.

E-money products can be hardware-based or software-based, depending on the technology used to store the monetary value.

*Hardware-based products.* In the case of hardware-based products, the purchasing power resides in a personal physical device, such as a chip card, with hardware-based security features. Monetary values are typically transferred by means of device readers that do not need real-time network connectivity to a remote server.

*Electronic Fund Transfer.* It is a very popular electronic payment method to transfer money from one bank account to another bank account. Accounts can be in same bank or different bank. Fund transfer can be done using ATM (Automated Teller Machine) or using computer.

The basic principle of account-based systems is that the exchange of money between accounts is maintained by a payment service provider. Users can authorize charges against their EPS accounts, as they would do with usual bank accounts, though the ways of authorization are different for various systems. With the debit approach, the customer maintains a positive balance of the account and money is subtracted when a debit transaction is performed. With the credit approach, charges are posted against the customer's account and the customer is billed for this amount later or subsequently pays the balance of the account to the payment service.

One of the most widely used systems for electronic payments is the debit card, which as the name suggest, is a clear example of a debit system, (Evans & Schmalensee, 1999). Debit cards combine the service of Automatic Teller Machines (ATM) cards and cheques. When customers pay with a debit card, the money is automatically deducted from their checking bank account. In contrast with the credit cards, the spent money comes from the bank account directly. Many banks issue a combined ATM/debit card that looks like a credit card and can be used in places where credit cards are accepted. In this case, when users pay with a debit card, the payment will still be processed as a debit

transaction. Other payment mechanisms that use the credit-debit model are Yahoo PayDirect, PayPal.com, and theoretical payment projects like NetBill (Sirbu and Tygar, 1995), and NetCheque (Medvinsky and Neuman, 1993). A special group of account-based instruments that are currently in wide use are credit card systems. A great part of trade on the Internet is done using credit cards and these payment systems should not be overlooked. The biggest advantage of this approach is that the customers, who have already received credit cards offline, can use them directly for online payments. This also results in high scalability, as no additional installations are necessary. Credit cards provide a large customer base for merchants who accept them, thus their applicability is quite high.

Over the years, credit cards have become one of the most common forms of payment for e-commerce transactions. In North America almost 90% of online retail transactions were made with this payment type. Increased security measures include use of the card verification number (CVN) which detects fraud by comparing the verification number printed on the signature strip on the back of the card with the information on file with the cardholder's issuing bank. Also online merchants have to comply with stringent rules stipulated by the credit and debit card issuers (Visa and MasterCard) this means that merchants must have security protocol and procedures in place to ensure transactions are more secure. This can also include having a certificate from an authorized certification authority who provides Public-Key infrastructure for securing credit and debit card transactions.

Despite widespread use in North America, there are still a large number of countries such as China, India and Pakistan that have some problems to overcome in regard to credit card security.

There are more concerns related to the credit card use in online e-commerce that are responsible for reluctant users acceptance of credit cards and e-commerce. According to the report published by marketing research firm IDC, almost half of European users of the Internet do not buy goods online because they either do not trust the Web merchants or fear their credit card details will not be secure. According to analysts, total credit card fraud rose to \$4 billion in 2002 (i.e. \$2 for every card issued). Industry estimates that the amount of online credit card fraud could be in the \$500 million range. Authorities believe that hackers have stolen more than one million credit card numbers from E-commerce sites. It would not be a surprise that many customers use their credit cards with reservations.

Privacy issues are also associated with the use of existing payment systems. There are cases when users' identities (i.e. personal data such as credit card numbers, names and addresses) were stolen when hackers break into websites' databases and obtain personal information of the customers. Fraudsters then attempt to use this information to open new credit and bank accounts using the stolen identity, (Philippsohn & Thomas, 2003). These and other issues with existing payment systems such as credit cards render them not very suitable for online payments.

At this stage the situation with the development of online EPSs is far from ideal. A survey on electronic money developments by the Bank for International Settlement reports a rather low level of EPSs use, even in the most advanced countries. According to the European Central Bank, the proportion of online payments among cashless payment instruments in the European Union is rather low. The report admits that although there has been a lot of discussion on the use of EPSs and their importance "it is still not a widely used medium". According to a survey by marketing research firm

Jupiter Research, credit cards are still the dominant payment method for online purchases, accounting up to 95% of online transactions in the United States. This demonstrates still low user acceptance of alternative electronic payment systems, designed specifically for e-commerce.

Across the European Union, the most commonly accepted online payment instruments are credit cards, direct debit cards and e-banking. A 2003 study of European Web sites found that 78% of Web sites in the sample studied accept classic credit cards, 51% direct debit and 9% e-banking (Figure 6, PwC, 2003). Some evidence suggests that in Europe as a whole the share of credit cards in online payments is lower compared to non-European countries and direct debit and online banking higher.

*There are such main characteristics of payment systems*

*Anonymity, privacy.* This characteristic reflects the desire of users to protect their privacy, identity and personal information. In some transactions, the identities of the parties could be protected by anonymity. Anonymity suggests that it is not possible to discover someone's identity or to monitor an individual's spending patterns. Where anonymity is important, the cost of tracking a transaction should outweigh the value of the information that can be obtained by doing so. As an illustration, when a customer pays with a debit card, the purchase is registered at the vendor and bank's databases. It is possible to find out what amount was paid and what actually was purchased. Thus debit card payments are not anonymous.

On the contrary, when one pays with cash at a shop or in a marketplace, no one can say by examining the cash that money came from the payer, as there is no direct information about this payer's personality associated with the banknotes. Thus, cash is an anonymous payment system. Currently, the

right of users to choose how their personal information is disclosed is viewed as privacy.

*Convertibility.* Naturally, users will select payment mechanisms as financial instruments according to their needs. Numerous payment schemes have emerged up to this date and users can expect new systems to appear, all providing an assorted variety of services and applications for various purposes. Funds represented by one payment mechanism should be easily convertible into funds represented by other payment systems. Users should be able to transfer money from electronic payment systems to another accepted money form, e.g. receive it in cash, or transfer to a bank account.

*Multi-currency.* Effective and efficient payments between different countries are possible when a system allows processing multiple currencies, as it is currently done with credit cards. This feature however is not implemented or foreseen in payment systems of many countries, binding them to a particular currency region. Multi-currency payments are decidedly required for payments in cross-border electronic business and e-commerce.

*Reliability.* Naturally, users and businesses want a system that is reliable, because the availability of services and the smooth running of an enterprise will depend on the availability and successful operation of the payment infrastructure. Whether in the result of a hackers' attack or simply poor engineering, the costs of breakdowns can be substantial, and the failure to maintain reliable operations can be unrecoverable.

### ***Mobile payment system***

These payment service allows merchants to accept credit card payments directly through their mobile devices, making it possible for devices such as the iPhone, the iPad and Android smartphones to act as a mobile point of sale

(POS) checkout system. Mobile payment, also referred to as mobile money, mobile money transfer, and mobile wallet generally refer to payment services operated under financial regulation and performed from or via a mobile device. Instead of paying with cash, cheque, or credit cards, a consumer can use a mobile phone to pay for a wide range of services and digital or hard goods. Although the concept of using non-coin-based currency systems has a long history, it is only recently that the technology to support such systems has become widely available.

Mobile payments aren't necessarily contactless payments. Originally mobile payments and other mobile services, like mobile banking, relied on text messaging to complete transactions. Many startup companies start out with text message services for customers and later move on to mobile apps and contactless payment systems that do not require the user to send or receive a text message.

Any device capable of making payments using radio-frequency identification (RFID) technology is using contactless payment technology. The device does not have to be a smartphone though this is the most commonly used device for contactless payments. An antenna and chip embedded into the device lets the customer wave their smartphone over a card reader to make a purchase.

Security for contactless payments is the same as for a credit card. Fraud protection laws all apply, and secure channels and encryption are used for sending credit card information and PIN numbers. For high-priced purchases or several purchases within a short period of time, the user is asked to manually enter her PIN number to ensure theft has not occurred. Typically contactless payments are faster because the PIN number or a signature is not

needed. It also, however, can cause the customer to spend more since paying is so quick and easy.

The first example of contactless payment came in the form of Speedpass in 1997. Mobil gas stations offered contactless payment devices that clipped onto a key ring. The customer waved the device over a labeled square at the gas pump and paid instantly. Today ExxonMobil still offers this service, and other gas stations are incorporating contactless payment technologies into their payment choices.

An organisation wanting to develop payment services for mobile devices can find the process exciting, fascinating and with enormous potential. Even so, there are risks involved.

Mobile phones are something financial organisations typically do not own and have little or no control over or experience with. In a way the risks are similar to the ones on payment services for personal computers, with the main differences being:

- mobile phones are easier to steal and/or lose. Research has shown that 9 million mobile devices are either lost or stolen globally every year, which is equivalent to 1 device every 3.5 seconds;

- mobile phones have limited input capabilities, so the usage of long or complicated passwords has a huge impact on the user experience and severely increases the number of failed logins;

- mobile phones are designed as portable devices, so two factor authentication mechanisms requiring the user to use additional hardware (in addition to the mobile phone itself ) such as one time password generators are likely to significantly hamper the service accessibility;

- mobile phones interact with several hosts outside of the user's control. Generally no or weak mutual authentication controls exists between the phone

and a third party. Third party applications might have access to unprotected sensitive information stored and processed;

- the owner of a mobile phone (handset hardware) has virtually no control on the device security configuration. A mobile phone is generally chosen for its functionality not security;

- malware on mobile phones is rising fast – and is apparently causing a drop in the creation and use of new, computer-related malware for the first time.

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