

**ACADEMIA DE STUDII ECONOMICE - București**  
**Bucharest University Of Economic Studies**  
**FACULTY OF BUSINESS ADMINISTRATION**  
(Facultatea de Administrare a Afacerilor cu predare în limbi străine)

**Technologies on e-Business**  
-  
**BUSINESS CATEGORIES AND MODELS IN Internet**

**By: Professor Vasile AVRAM, PhD**  
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## 4 BUSINESS CATEGORIES AND MODELS IN Internet

### 4.1 Business Concepts and Categories

#### 4.1.1 Business Concepts

The Internet is creating a new ‘universal’ technology platform on which to build all sorts of new products, services, strategies, and organizations. It is reshaping the way information systems are being used in business and daily life. By eliminating many technical, geographic and cost barriers obstructing the global flow of information, the Internet is inspiring new uses of information systems and business model.

Business models are built by combining business concepts and requires a sophisticated operationalization of those concepts by transforming that abstract theory into measurable actions. Enterprise value depends in large measure on how quickly a company identifies and realizes a superior business model from the following four basic elements: customer value proposition, profit formula, key resources, and key processes. An effective corporate information environment instantiates the skills and intelligence of the company’s people and serves as a persistent institutional memory. The new searching technologies for exploration of information and data combined with enterprise social networking can help really to find answers or people with answers. In addition, an organization’s electronic intelligence (in the form of processes, databases, and visualizations, for example) “amplifies” human intelligence [KOJ-11].

The Internet provides the primary technology platform for the **digital firm**. In the following paragraphs are introduced the main concepts used to define business-categories and business environment in Internet.

**Digital firm.** A **digital firm** is one where nearly all of the organization’s significant business relationships with customers, suppliers, and employees are digitally enabled and mediated. In a digital firm, any piece of information required to support key business decisions is available at any time and anywhere in the firm. Core business processes are accomplished through digital networks spanning the entire organization or linking multiple organizations.

**Business processes.** A **business processes** refer to the unique manner in which the work is organized, coordinated, and focused to produce a valuable product or service. Key corporate assets – intellectual property, core competencies, financial and human assets – are managed through digital means. Digital firms sense and respond to their environments far more rapidly than traditional firms, giving them more flexibility to survive in turbulent times. Digital firms are distinguished from traditional firms by their near total reliance on a set of information technologies to organize and manage.

**Electronic market.** By linking thousands of organizations and millions of individuals into a single network the Internet creates the foundation for a vast marketplace. An **electronic market** is an information system that links together many buyers and sellers to exchange information, products, services, and payments. It allows participating sellers and buyers to exchange goods and services with the support of information technology. Electronic markets have three main functions:

- 1) matching buyers and sellers;
- 2) facilitating commercial transactions;
- 3) providing legal infrastructure.

The main players in an electronic market are represented by businesses, individuals, and government organizations.

**Electronic commerce (e-commerce).** Electronic commerce (e-commerce) is the process of buying and selling goods and services electronically with computerized business transactions using Internet, networks, and other digital technologies. It also encompasses activities supporting those market transactions, such as advertising, marketing campaigns management and analysis, customer support,

delivery, and payment. It builds initially on traditional commerce by adding to this the flexibility offered by the computer networks and the availability of the Internet together with its specific technologies. E-business requires some “specialized” network support such as intranet and extranet and refers to a broader definition of e-commerce, not just to the buying and selling of goods and services, but also servicing customers, collaborating with business partners, and conducting electronic transactions within an organization and even between cooperating organizations, as suppliers are in many cases. E-business encompasses all companion activities that a firm performs for selling and buying services and products using computers and communications and Internet technologies.

E-business includes broadly a host of related activities, such as, among others, online shopping, sales force automation, supply chain management, electronic payment systems, and order management.

E-commerce sites are either pure e-businesses, such as Amazon.com, or they have an e-commerce presence, such as Wal-Mart Stores. Some e-commerce sites sell products, such as CDs and computers. Some e-commerce sites sell services, such as computer training and consulting. Any company could have an e-commerce presence, but it is not necessarily an e-business [Bh-02].

By generating and delivering timely and relevant information through computer networks, e-commerce creates new opportunities for conducting commercial activities online, and thus it fosters easier cooperation between different groups, such as branches of a multinational company sharing information for a major marketing campaign, companies working together to design and build new products or offer new services, or businesses sharing information to improve customer relations.

**Electronic business (e-business).** The extensive use of business information (informatics) system through an organization is commonly referred to as **electronic business** or **e-business**. There are two common definition of e-business concept:

- “all electronically mediated information exchange, both within an organization and with external stakeholders supporting the range of business processes”;
- “the use of Internet and other digital technology for organizational communication and coordination and management of the firm”.

The processes that can be enhanced by e-business are standard processes that occur within any organization.

[BIS-TDM; KLJL] There are seven main operating organizational processes:

1. Understand markets and customers;
2. Develop vision and strategy;
3. Design products and services;
4. Market and sell;
5. Produce and deliver services;
6. Produce and deliver services (services organization);
7. Invoice and service customer.

These processes have companion the following support and management processes:

1. Develop and manage human resources;
2. Manage information;
3. Manage physical and financial resources;
4. Execute environmental management program;
5. Manage improvement and change.

According to the resource-based-theory e-business is about [PG-07]:

- developing and applying internal and external resources for competitive advantage;
- applying an e-business model that supports the current or desired value configuration of a value chain, value shop, and/or value network;
- making progress over time, as both technology and market conditions evolve .

This requires an understanding of system dynamics, where feedback loops between company actions and market reactions create or destroy infrastructure initiatives.

Electronic business brings a unique set of challenges to the information technology infrastructure (such as site capacity, scalability, and fault-tolerance, business information systems, etc) and his viability depends on the ability of the underlying systems to offer timely and reliable services. . E-business, as a major contributor to the popularity of global information systems, is a system that

includes not only those transactions that center on buying and selling goods and services to generate revenue, but also those transactions that support revenue generation. These activities include generating demand for goods and services, offering sales support and customer service, or facilitating communications between business partners.

**Virtual Private Network (VPN).** The VPN is a connectivity deployed over a shared infrastructure and governed by the same policies and performance criteria as the private/ local area networks are. As all network/ Internet types communications, VPN type realized by the cooperation of a large number of technologies and protocols. They falls into two broad categories called site-to-site and remote access. The site-to-site VPN can be of two types:

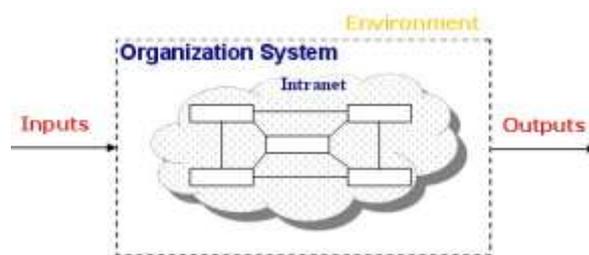
- Intranet VPNs – that allow the connectivity between sites of a single organization (such as the networks deserving its branches/ sites geographically distributed);
- Extranet VPNs – that allows business partners (as suppliers and business customers are) or individuals (as customers) to connect to company’s network.

The remote access allows individuals - mobile or home-users – to access remotely the organizations resources.

The presumptive benefits that can be realized, from a business perspective, include [TK-07]:

- Obtaining a competitive advantage due to closer relationships with business partners and customers and higher agility;
- Creating new channels of service delivery;
- Reaching new markets with less cost;
- Offering higher-value information with removal of security concerns that have hampered this effort in the past.

**Intranet.** An **intranet** is an internal network based on Internet and World Wide Web technology and standards (figure 4.1). An intranet allows organizations include all geographically distributed branches or divisions (the local networks deserving them) in a “global” area network (Wide Area Network, as suggested by the background cloud, inside of the organization boundaries)

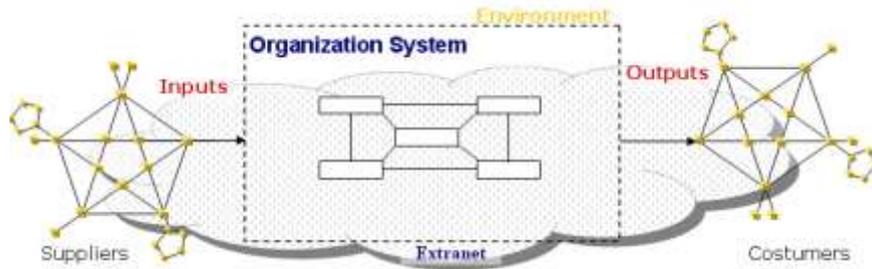


**Figure 4.1 Intranet**

in which the users work as they are in a local area network. The local area networks can be connected by using organizations private connections or by using VPN (Virtual Private Network) over the Internet. The intranets are inexpensive, scalable to expand or contract as needs change, and accessible from most computing platforms. The intranets provide instant connectivity by the usage of the Web software that provide a uniform interface that allows unifying the computers, does not mother the platform to which they conform. The intranets provides a reach set of tools for creating collaborative environments in which members of an organization can exchange ideas, share information, and work together on common projects and assignments regardless of their physical location. Companies can connect their intranets to internal company transaction processing systems, enabling employees to take actions central to a company’s operations. Intranets can also be used to simplify and integrate business processes spanning more than one functional area and, in that way, a better informatic modeling of his information system. In companies where the processing is done manually or by non-integrated informatic support systems the same data are collected and processed in a redundant way and having a “distributed responsiveness”. The cross-functional processes can be coordinated electronically, increasing organizational efficiency (at least by eliminating redundant operations and tasks) and responsiveness (from a distributed one to a centralized one), and they can also be coordinated with business processes of other companies. By the usage of intranet the company can better model, in his integrated informatic system, the systems interdependencies and interrelationships or can integrate his individual software packages by defining electronic pathways for automatic online communication. The foreground graphic (the rectangles and lines connecting them) represent the various informatic subsystems deserving the company operation and control focused to a centralized control (does no matter if the applications processing and/or data-

sources can run in parallel, distributed or centralized). The information inputs and outputs of the company do not exclude electronic data interchange between companies (suppliers and/or customers).

**Extranet.** When a company gives access to third parties (such as suppliers and customers) to his intranet the obtained network is called extranet (figure 4.2). An **extranet** is a private intranet that is accessible to authorized outsiders, as suggested in the figure by the background cloud crossing the boundaries and including parts of external networks. The front (suppliers) and end (clients; buyers) sides linked to complex networks not necessarily distinct (can be the same one Internet!) tray to



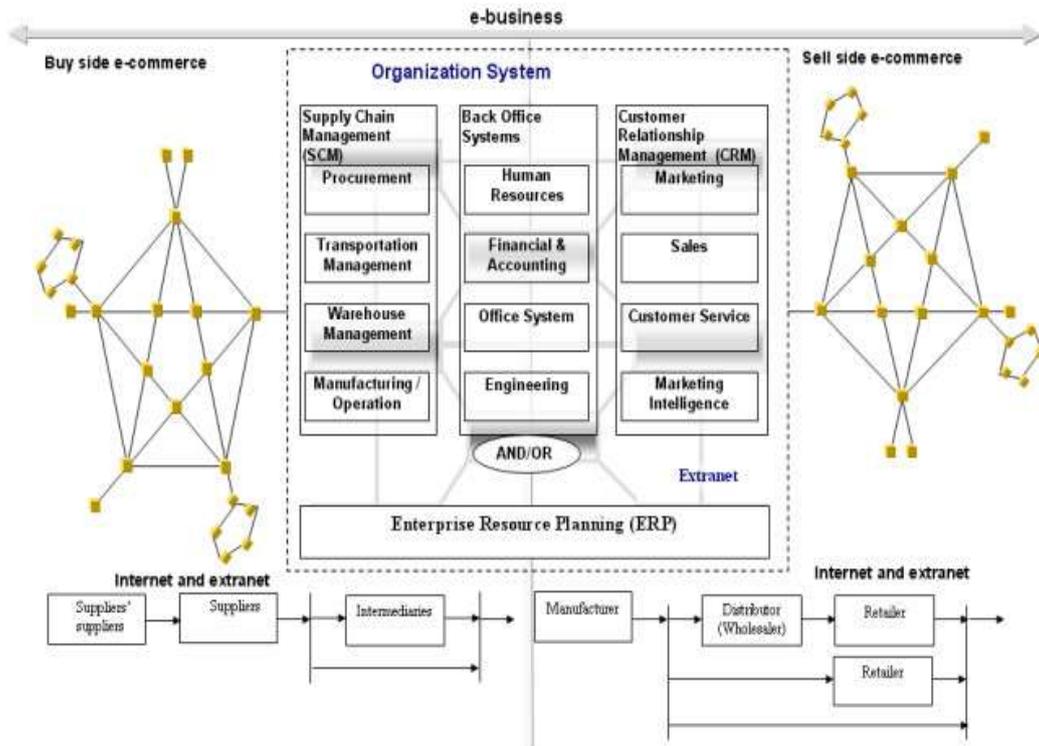
**Figure 4.2 Extranet**

suggest two of the roles played by the organization’s partners (suppliers and consumers). The usage of extranet allows an extension of the integration of different categories of informatic systems. This extended integration gives many benefits to the company (reducing time for operation, increasing speed of feed-back, increasing the accuracy of cross-boundary data and information etc). For example, if a supplier sends you the invoice electronically you do not need to retype the transactions included; instead of typing you must check and validate the electronic data and accept as input for your applications. Trading partners can communicate with each other, bypassing intermediaries and inefficient multilayered procedures. Web sites are available to consumer 24 hours a day. Some information-based products, such as software, music, books, and video, can actually be physically distributed via Internet. Internet technology has proved especially useful for supply chain management and collaborative commerce.

**Private industrial network.** A private industrial network or net marketplace (or e-hubs) is a web-enabled network linking systems of multiple enterprises (firms, companies, organizations etc) for the coordination of enterprises trans-organizational business processes. The network is owned by the buyer and it permits the firm and designated suppliers, distributors and other business partners to share product design and development, marketing, production scheduling, inventory management, and unstructured communication including graphic and e-mail. A net marketplace provides a single digital market place based on Internet technology for many different buyers and sellers.

**The e-business – e-commerce relationships**

Figure 4.3 suggest the organization system faced to his e-commerce/e-business relationships with the consumers, as a sell side end, and suppliers, as a buy side front:



**Figure 4.3 The extended company and management of customers and suppliers relationships**

1) Inside of the company's system boundaries suggested two situations:

- the usage of traditional support software systems grouped in so called back-office systems interfaced to the buy side by specialized software designated to the management of the relationships with suppliers (SCM-Supply Chain management) and to the sell side by the specialized software designated to the management of the relationships with the costumers (CRM-Customer Relationship Management). Bellow is a brief presentation of both SCM and CRM solutions;
- the usage of ERP (Enterprise Resource Planning) systems that provides a single informatic solution from a single software developer with integrated functions for major business functions such as production, distribution, sales, finance & accounting, and human resources management. The implementation of enterprise resource planning (ERP) systems allows enterprises to integrate and optimize their internal operations, such as production engineering, financial controllng and human resources. The enterprise resource planning systems are integrating web connections to leverage the speed and ubiquitous nature of the Internet (for example, SAP's R/3 system is Internet compatible and can be combined with other types of software under the enterprise).

Both situations suppose the existence of intranets and extranets support.

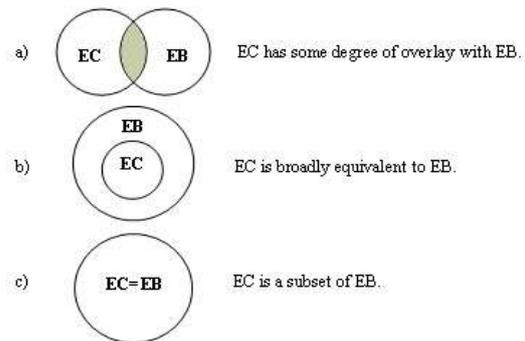
2) the buy side e-commerce suggest the e-commerce transactions between purchasing organization and its suppliers. These relationships are mapped across the support offered by both intranet and extranets so that is possible to realize Internet-based supply-chain management allowing all supply-chain participants receive and exchange information on purchasing, production, and shipping at real-time. The organization suppliers can deliver directly their products and/or services or by using intermediaries. In turn the organization suppliers can have relationships with their own suppliers (suppliers' suppliers). The usage of SCM e-commerce is the source of disintermediation, defined as the removal of organizations or business processes layers responsible for certain steps in the value chain;

3) the sell side e-commerce suggests the e-commerce transactions between supplier organization (manufacturer) and its customers. This side includes the direct sell to customers by applying the disintermediation (the companies can obtain higher profit while charging lower prices) or the usage of different categories of intermediaries (Distributors and/or Retailers).

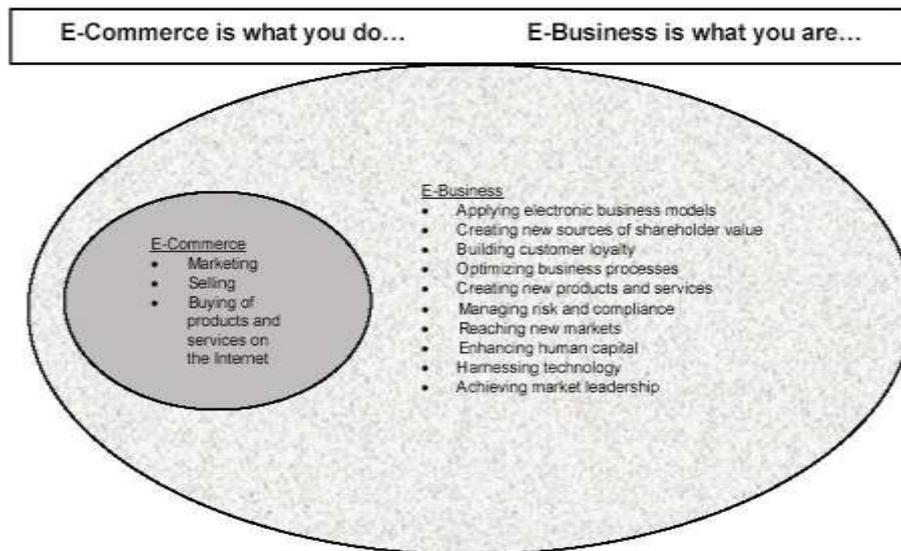
Electronic commerce, global competition, and the rise of digital firms have made companies think strategically about their business processes for managing their relationships with customers and suppliers.

The relationships between e-commerce (EC) and e-business (EB) can be described as illustrated in figure 4.4.

Figure 4.5 shows the relationship between e-commerce and e-business by separating the activities specific to each other.



**Figure 4.4 e-commerce – e-business relationships**  
(Source of figure [BIS-TDM])



**Figure 4.5 e-commerce is a part of e-business** (source [PG-07])

**CRM (Customer Relationship Management).** Instead of treating customers as exploitable source of income, businesses are now viewing them as long-term assets to be nurtured through customer relationship management (CRM). CRM focuses on managing all of the ways that a firm deals with its existing and potential new customers. CRM is both a business and technology that uses information systems to coordinate all of the business processes surrounding the firm’s interactions with its customers in sales, marketing and service.

**SCM (Supply Chain Management).** Supply chain management is the close linkage and coordination of activities involved in buying, making, and moving a product. It integrates supplier, manufacturer, distributor, and customer logistic processes to reduce time, redundant effort, and inventory costs. The supply chain is a network of organizations and business processes for procuring materials, transforming raw materials into intermediate and finished products, and distributing the finished products to customers.

It links suppliers, manufacturing plants, distribution centers, conveyances, retail outlets, people, and information through processes such as procurement, inventory control, distribution, and delivery to supply goods and services from source to consumption. Materials, information, and payments flow

through the supply chain in both directions. Goods start out as raw materials and move through logistics and production systems until they reach customers. The supply chain include reverse logistic in which returned items flow in reverse direction from buyer back to the seller.

The supply network is a critical component of any e-business strategy. Information sharing has always been the key to coordination. With the advancement of communication technologies, such as intranet, extranet, electronic data interchange (EDI), and virtual private network (VPN), companies have already started to coordinate their purchasing, production, and distribution activities to reduce cycle times and cut operational costs.

### 4.1.2 Business Categories

There are many ways in which electronic commerce transactions can be classified such as [BIS-TDM; KLJL]:

- the nature of participants (figure 4.6): business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C);
- the participant's physical connection – mobile commerce (m-commerce).

**Business-to-consumer (B2C)** electronic commerce involves retailing products and services to individual shoppers;

**Business-to-business (B2B)** electronic commerce involves sales of goods and services among business. Companies can sell to other business using their own web sites as electronic storefronts or they can execute purchase and sell transactions through private industrial networks or net marketplace. Net marketplace is the faster-growing type of B2B.

**Consumer-to-consumer (C2C)** electronic commerce involves consumers selling directly to consumers.

The electronic business value chain described in figure 4.3 bottom can be described considering the business categories involved between participants, as shown in figure 4.7.

**Mobile commerce (m-commerce)** involve using of handheld wireless devices for purchasing goods and services. Both B2B and B2C transactions can take place using m-commerce technology.

TO	Business	B2C	C2C
	Consumer	B2B	C2B
		Business	Consumer
		FROM	

Figure 4.6 Business categories

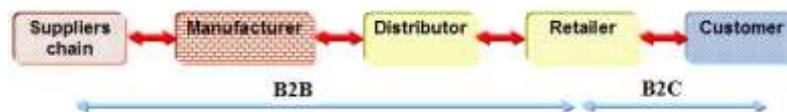


Figure 4. 7 The electronic business value chain

## 4.2 Business Models

A **business model** describes how the enterprise delivers a product or service, showing how the enterprise creates wealth. Business models have been defined and categorized in many different ways, the models are implemented in a variety of ways, and they are perhaps the most discussed and least understood aspect of the web.

A definition of business model together with the evolution of business model concept can be given in reference [OPT]: “A *business model is a conceptual tool that contains a big set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams*”.

In [PG-07] you can found the following alternative definitions:

”A business model can be defined as the method by which a firm builds and uses its resources to offer its customers better value than its competitors and to make money doing so. It details how a

firm makes money now and how it plans to do so in the long run. The model is what enables a firm to have a sustainable competitive advantage, to perform better than its rivals in the long term.”

”An e-business model is a description of the roles and relationships among a firm's consumers, customers, allies, and suppliers that identifies the major flows of product, information, and money, and the major benefits to participants.”

A business model draws on a multitude of business subjects, including economics, entrepreneurship, finance, marketing, operations, and strategy.

Chesbrough and Rosenbloom [CheRo] outlined the following six components of the business model:

1. **Value proposition** - a description of the customer problem, of the product that addresses the problem, and of the value of the product from the customer's perspective;
2. **Market segment** - the target group of customers;
3. **Value chain structure** - the position and activities in the value chain of the firm and how that will capture part of the value that it creates in the chain;
4. **Revenue generation and margins** - how revenue is generated (sales, leasing, subscription, support, etc.), the cost structure, and target profit margins;
5. **Position in value network** - identification of competitors, complementors, and any network effects that can be utilized to deliver more value to the customer.
6. **Competitive strategy** - how the company will attempt to develop a sustainable competitive advantage.

Managing an organization's e-business adoption strategy has proven to be a daunting task. Strategic decisions with far-reaching implications must be made on a timely basis.

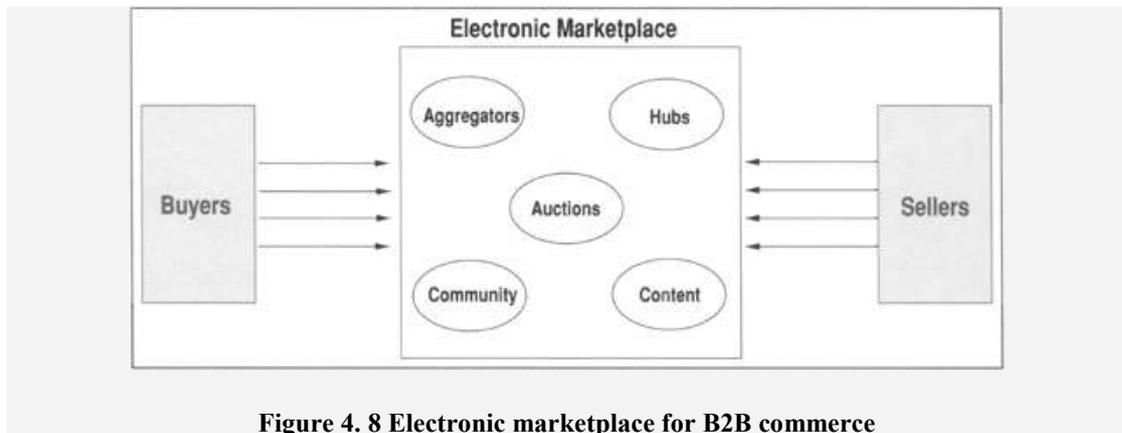
The collapse of NASDAQ's high-tech (dot-com) stocks during 2000/2001 offers painful proof of the extraordinary challenges associated with managing e-business. Gone are the days of evaluating new venture start-ups based on burn rates, over-inflated revenue estimates and the vita of a silicon-valley cowboy. Indeed, the “irrational exuberance” in dot-com company stock market valuations has come to fruition. The market has forced companies to focus, once again, on the basics: cost, quality and profitability. Lock-step with this *back-to-the-basics* pendulum swing, is the utilization of a business model that is long-term focused, profit-based, and includes the unique challenges (and opportunities) with conducting commerce via the Internet.

The business model should enable the cost, quality and profitability basic necessities, utilizing a long-term profit-based business plan, while simultaneously accommodating the unique business issues associated with e-commerce.

As firms integrate e-business into their existing business, they migrate from traditional physical business models to combined physical and virtual models. This shift increases the role of the information technology infrastructure because information and online transaction processing become more important.

B2B interactions involve much more complexity [DMVA] than B2C and typical B2B transactions include, among others, the following steps: i) review catalogs, ii) identify specifications, iii) define requirements, iv) post request for proposals (RFP), v) review vendor reputation, vi) select vendor, vii) fill out purchase orders (PO), viii) send PO to vendor, ix) prepare invoice, x) make payment, xi) arrange shipment, and xii) product inspection and reception.

Several models and classifications have been proposed for B2B commerce, as Internet and e-market evolves. Figure 4.8 illustrates an electronic marketplace for B2B trading as defined in [DMVA]. The model could be oriented to a vertical market (e.g., wholesale trade, chemicals, construction, and electronics) or to a horizontal approach (e.g., office supply, and logistics).



**Figure 4. 8 Electronic marketplace for B2B commerce**

<b>Model</b>	<b>Description</b>
<b>Aggregators</b>	<p>One company aggregates buyers in order to form a virtual buying entity and/or aggregates suppliers to constitute a virtual distributor. The aggregator takes the responsibility for selection and fulfillment, pricing, and marketing segmentation.</p> <p>For example, in the science marketplace, one company became the central buying location for thousands of buyers to implement their own purchasing rules and obtain volume discounts. Another example is an electronic company that offers a total home buying service, from search to financing, under one site.</p>
<b>Hubs or Process Integration</b>	<p>Focuses on producing a highly integrated value proposition through a managed process. Hubs have been defined as neutral Internet-based intermediaries that focus on a specific industry or a specific business process. Hubs host electronic markets and create value by reducing costs of transactions between sellers and buyers. There are examples of vertical hubs that serve a vertical market or a specific industry, such as energy, steel, telecommunications, and plastic. On the contrary, functional hubs specialize in horizontal markets across different industries. Functional hubs focus on business processes such as maintenance, repair and operating, procurement. For instance, an electronic business company that provides office supplies to many industries is a good example of a functional hub in a B2B commerce.</p>
<b>Community or Alliance</b>	<p>In the community model, alliances are used to achieve high value integration without hierarchical control. Members and end users play key roles as contributors and customers. Basically, communities produce knowledge with economic value, such as Linux, MP3, and Open Source.</p>
<b>Content</b>	<p>Content is the end product of this model of B2B commerce. It has the purpose of facilitating trading. Revenue can be generated from subscriptions, membership, or advertising. For example, there are e-companies that sell information about contracts to bid, market intelligence and analysis, and jobs by industry.</p>
<b>Auctions or Dynamic Pricing Markets</b>	<p>Auctions or dynamic pricing markets handle complex exchanges between buyers and sellers in B2B commerce. Auctions are dynamic and efficient mechanisms for mediating and brokering in complex marketplaces, like supply-chain and procurement systems. Bundle auctions allow agents to bid for bundles of items and are useful for B2B applications such as automatic supply-chain or procurement.</p>

#### 4.2.1 Classification of e-business models

There exists many classification criteria of Internet business models and we don't have yet a common point of view.

In determining an appropriate e-business model, several criteria can be used, such as [PG-07]:

- **Involved parties**, such as business-to-business, business-to-consumer, and/or consumer-to-consumer;
- **Revenue sources**, such as transaction fee, product price, and/or exposure fee;
- **Value configuration**, such as value chain, value shop, and/or value network;
- **Integration** with customers and/or partners;
- **Relationships**, such as one-to-many, many-to-many, and/or many-to-one;
- **Knowledge**, such as know-how, know-what, and know-why.

One classification of Internet business models is presented by K. Laudon and J. Laudon ([KLJL]):

- **Virtual storefront:** Sells physical products directly to consumers or to individual businesses (Amazon.com, EPM.com)
- **Information broker:** Provides product, pricing, and availability information to individuals and businesses. Generates revenue from advertising or from directing buyers to sellers (Edmunds.com, Kbb.com, Insweb.com, IndustrialMall.com)
- **Transaction broker:** Saves users money and time by processing online sales transactions, generating a fee each time a transaction occurs. Also provides information on rates and terms (etrade.com, Expedia.com)
- **Online marketplace:** Provides a digital environment where buyers and sellers can meet, search for products, display products, and establish prices for those products (eBay.com, Priceline.com, ChemConnect.com, Pantellos.com)
- **Content provider:** Creates revenue by providing digital content, such as digital news, music, photos, or video, over the Web (WSJ.com, CNN.com, TheStreet.com, Gettyimages.com, MP3.com)
- **Online service provider:** Provides online service for individuals and businesses. Generates revenue from subscription or transaction fees, from advertising, or from collecting marketing information from users (@Backup.com, Xdrive.com, Employease.com, Salesforce.com)
- **Virtual community:** Provides online meeting place where people with similar interests can communicate and find useful information (Motocross.com, iVillage.com, Sailnet.com)
- **Portal:** Provides initial point of entry to the Web along with specialized content and other services (Yahoo.com, MSN.com, StarMedia.com)

Another way to classify the Internet business models, proposed by Weill and Vitale ([WV-01]) and reconsidered and updated in [PG-07], identifies a finite number of atomic e-business models that can be combined as building blocks to create tailored e-business modes and initiatives, as follows:

1. **Direct to customer:** buyer (individual or business) and seller (does no matter is a retailer, a wholesaler, or a manufacturer) communicate directly. Examples of the direct-to-customer model are Dell Computer Corporation and Gap, Inc.
2. **Full-service provider:** provides total coverage of customer needs in a particular domain, consolidated via a single point of contact. Examples of the full-service provider are the Prudential Advisor and GE Supply Company.
3. **Whole of enterprise:** The single point of contact for the e-business customer is the essence of the whole-of-enterprise atomic business model. Although many of this model's breakthrough innovations have occurred in public-sector organizations, the model is applicable in both the for-profit and the public sectors.
4. **Intermediaries** such as portals, agents, auctions, aggregators, and other intermediaries. E-business is often promoted as an ideal way for sellers and buyers to interact directly, shortening old-economy value chains by disintermediating some of their members. Examples of

intermediaries are electronic malls, shopping agents, specialty auctions, electronic markets, electronic auctions, and portals.

5. **Shared infrastructure:** The firm provides infrastructure shared by its owners. Other suppliers, who are users of the shared infrastructure, but not owners, can also be included. Customers who access the shared infrastructure directly are given a choice of suppliers and value propositions. The owner and the non-owner suppliers are generally represented objectively.
6. **Virtual community:** By using IT to leverage the fundamental human desire for communication with peers, virtual communities can create significant value for their owners as well as for their members. Once established, a virtual community is less susceptible to competition by imitation than any of the other atomic business models. In this business model, the firm of interest—the sponsor of the virtual community—sits in the center, positioned between members of the community and suppliers.
7. **Value net integrator:** control the virtual value chain in their industries by gathering, synthesizing, and distributing information. Value net integrators add value by improving the effectiveness of the value chain by coordinating information. Examples of value net integrators are Seven-Eleven Japan and Cisco Systems.
8. **Content provider:** a firm that creates and provides content (information, products, or services) in digital form to customers via third parties. The physical-world analogy of a content provider is a journalist, recording artist, or stock analyst. Digital products such as software, electronic travel guides, and digital music and video are examples of content. A virtual-world example of a content provider is weather forecasters such as Storm Weather Center.

#### 4.2.2 Common of Internet e-business models

The most common of Internet e-business models are the following:

**The Merchant.** A merchant is a wholesaler or retailer of goods and services.

The merchant provides a website with product information and an online ordering mechanism. Users select the products they want to buy and place an order. The product price can be fixed or negotiable. The merchant makes his money the same way as traditional "brick-and-mortar" shops: through the profit margin in the product price. This model is mainly suited for physical goods and services, such as books, computers or a pizza delivery service. The merchant can directly reach end users and sell to them without needing wholesalers or retailers.

**Click-and-mortar merchants.** "Click-and-mortar" shops combine a website with a physical store.

In that way these business have the additional advantage that they (usually) already have an established brand name, and that they can use their physical store to promote the website. Because they have a physical location the users can return unwanted or defective products simply by going to the store, rather than mailing it to a web site operator. Traditional mail-order businesses (catalog merchants) already have the necessary facilities to process orders over the Internet (basically, orders come in by e-mail rather than by letter or phone, the shipping and handling is the same).

**Build to order merchants.** Offering of goods and services for sale that can be customized as client suggest.

A manufacturer (such as a computer vendor, for example) can use this model by offering his goods or services for sale and having the ability to order customized versions. The customized product is then assembled individually and shipped to the customer. This provides added value to consumers and allows the manufacturer to create only those products that will be sold.

**The service provider.** Offering services via Internet.

For some services, the merchant model is quite appropriate. For example, a pizza delivery service can operate on a pay-per-item basis. However, many Internet-based services cannot easily be handled in this way. It is often difficult to define the "product" that is sold, or to set a price for this product. For instance, a news site can offer the service of access to its archive, but even one dollar is probably too much for retrieving one article. Some service providers provide advertising-based access to their service, hoping to recover the costs through revenue from the advertisers. However, this appears to be a doomed strategy, since few ad-driven sites are able to get sufficient income (Yahoo! being one of the very few successful ones).

**Subscription-based access.** Allow client access their services, in a gradual manner, based on client subscription amount.

Many service operators provide subscription-based access to their service. A user pays a fixed amount per month or year and in return gets unlimited actions to the service. Alternatively, a base fee can be paid per month and all access beyond a certain limit is subject to a surcharge. This model is typically used when accessing databases with articles, news, and patents but also for online games or adult websites. However, the viability of subscription-based models is doubtful (a 2000 survey by Jupiter Communications found that almost half of all Internet users would not pay to view content on the web). To entice users into subscribing, "teasers" or selective portions may be made available for free. For example, showing headlines for articles in a news archive or allowing access to patent documents one page at a time.

**Prepaid access.** The offered services require payment by units (minute, data transfer amount, etc).

Some services, in particular telephony, require payment by the minute. This can be handled via a subscription, but a viable alternative is prepaid access. In this scheme, users pay a certain amount of money, which gives them access to the service for a certain amount of time, or access to a certain amount of content. When the amount is spent, the user can prepay another amount for further access. Often, implementations involve a smartcard on which the available credit is stored. Payment is realized by buying such a smartcard. The available credit on the smartcard is reduced during usage of the service. Prepay schemes have the advantages that they do not require subscription details to be maintained, and that they give users greater control over how much to spend on the service.

**The broker.** Brokers or intermediaries create markets by bringing buyers and sellers together and facilitating transactions between them. Those can be business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C) markets.

A broker makes money by charging a fee for every facilitated transaction, for instance as a percentage of the price of the transaction. Some special types of brokers are:

- **Group buying** - bringing individual potential buyers together in order to buy as a group, which should result in a lower price for each buyer (volume discounts, etc).
- **Classified ads** - sellers can advertise their product on a site where buyers can find it. The broker makes money in various ways: the seller pays a placement fee, or the broker receives a portion of the price paid by the buyer.
- **Bounties** - the broker offers a reward for finding a person, thing, idea, or other desired, but hard to find item. The broker may list items for a flat fee, or charge a percentage of the reward if the item is successfully found.

The broker is also used in the architecture of offered web services as described in the chapter 1, §1.4.

**The sales representative.** Business based on a commission.

Sales representatives often work on a commission basis: they sell an item for someone else and get a percentage of the price. On the Web, this model has developed into what is known as affiliate programs or referral fees. Someone creates a website on a particular topic and adds links to products on a merchant site which are related to his topic, so his visitors can buy those. For example, a music reviewer can add a link in a review to an online music store where the CD being reviewed can be ordered. If the reader likes the review, he can following the link and buy the CD. The merchant then pays the reviewer a commission or referral fee to the reviewer for referring to his site.

This model is realized as follows:

- The reviewer registers at the merchant site and receives a unique code;
- He adds this code to all the links to the merchant site whenever he links to a product at that site;
- When a reader follows the link, the merchant site sees the code and couples the reader's actions to the code;
- When the reader buys something the site registers the sale together with the code. Later all sales matching that code can be collected so the percentage can be computed and credit to the reviewer.

There are many variations on this theme. A fixed percentage can be paid to all sales resulting from the referral or a high percentage can be given to the actual product to which he linked, possibly with a low percentage on other sales that resulted from the link. This model is used by Amazon, Proxis, CD-Now and others. Some book authors link to their own book this way, making more money to the referral fee than to the royalties they get in. Subscription-based services also sometimes offer a referral fee to anyone who brings in a new subscriber. It is easy and safe to participate in an affiliate model, even for individuals. Anyone who can set up a website can link to a product, and if things go well, make money. If not, then no effort or investment is wasted. This explains the popularity of the model on the World-Wide Web.

**The advertiser.** Advertising-driven sites.

Advertising-driven sites are currently one of the cornerstones of E-commerce. The principle is simple and well known: the site offers free access to something and shows advertisements on every page and when a user clicks on an advertisement, he goes to an advertiser's page. The advertiser pays the site

operator for showing his advertisement (eyeballs) or for every time someone clicks on the advertisement (click-through). The same idea is popular in computer programs. Users can download and use the program for free but advertisements are shown during operation or startup of the program. In particular, advertisements can be shown when the user needs to wait for some time-consuming operation, such as printing or scanning.

**Targeted advertising.** Sites realizing targeted advertising.

It is well known that an advertisement related to the topic at hand on the site will get higher exposure and click through since such advertisements are targeted to the site visitors. So, the site operator earns more money if he places targeted advertisements. When displaying advertisements in a computer program, it is possible to target the advertisements to the purpose of the program, e.g., a spreadsheet shows advertisements for a stock brokering service. Racing games, soccer games and the likes commonly show billboards in the game to emulate the look of the real playing field. The advertisements thereon can be chosen as "real" advertisements.

Search engines use this idea as well, but relate the advertisements to the keywords entered in a query. For instance, if someone searches information on holidays, an advertisement is shown for a hotel chain on the page with search results. The advertisement can further be targeted based on the user profile for the user doing the search (e.g., if the profile shows the user likes to swim, an advertisement is shown for a beach hotel).

The existence of advertising-driven sites created a business opportunity for companies such as DoubleClick, which collects advertisements from many sources and arranges for placements on different sites. The sources pay DoubleClick for placing their advertisements, and this revenue is then shared with the site owners. Additionally, DoubleClick tracks the users that view all the advertisements, which allows it to build a user profile. This profile can then be used to more accurately target advertisements to these users.

**Updating advertisements.** Scheduled advertising for off/on line presentation.

It is desirable to be able to present the user fresh advertisements periodically, even when he is not connected to the network. To this end, his browser or other client can download multiple advertisements simultaneously and display them one at a time when he is offline. A screensaver can also be used to present advertisements when the system is idle. The screensaver periodically downloads new advertisements and/or news messages, and presents them to the user.

**Portal sites.** Sites which provide the main method of access to other web sites.

A portal offers one-stop access to different content and services, such as searching, news, e-mail, stock information, message boards or chat. By offering the option to personalize the interface and presented content (see, for example, my.cnn.com or my.yahoo.com), the portal is made more attractive to the user. The portal site can target its advertisements based on the personalization information. Examples of portals include Yahoo ([www.yahoo.com](http://www.yahoo.com)), MSN ([www.msn.net](http://www.msn.net)), Netscape Netcenter ([home.netscape.com](http://home.netscape.com)), IBM ([www.ibm.com](http://www.ibm.com)), ASE ([www.ase.ro](http://www.ase.ro)) etc.

**Attention/incentive marketing.**

In this model, a user downloads and views many advertisements and clicks on them, which generates revenue for the intermediary which provided these advertisements to the users. This revenue is then shared with the users in proportion to the number of advertisements they viewed and clicked on. Often, the user is asked to enter demographic information, which the intermediary shares with the advertisers.

A difficult problem in this area is how to guard against fraud. A user could employ a computer program that automatically clicks on all advertisements sent by the intermediary. This way, he collects a large amount of money without actively seeing the advertisements. Thus, it is recommended to measure the time between showing the advertisement and the user's reaction. If that time is too short, or the same every time, it is likely that something is amiss.

If the advertisement is in the form of a video or audio fragment, the user could also be asked to press a particular button or answer a question at some point during the advertisement.

Another solution involves the use of a smartcard. The user must insert a smartcard in a television system or the like, and the reward (usually in the form of credits, although digital cash can also be used) is recorded on the smartcard. When the advertisement has been shown, the card is ejected, so that the user must re-insert the card for the next advertisement.

**Free access.** Users are given something for free, but the something comes with advertisements.

A few examples: free web space providers typically provide advertising banners at the top or bottom of its users' sites (or as a separate, pop-up window). Free Internet access providers show advertisements on the starting page its users see when they go online. Electronic greeting cards are sent with a personal message and an advertisement. Since the user base is very diverse, it is hard to accurately target advertisements, making the expected revenue low.

**The auction room.** In an auction, the price of a product is made dependent on what buyers are willing to pay.

There are a number of models for performing an auction, the two most well-known being the "open" auction and the "reverse" auction.

**Open auctions.** In the "open" auction, participants repeatedly place higher bids for a product under auction. The person who places the highest bid is awarded the product. Networks such as the Internet make it possible for a large number of bidders to participate simultaneously in one auction. Handling bids can even be automated, so that no human auctioneer is necessary.

Famous auction site eBay offers the option to participate in an auction automatically. The bidder enters an initial bid, an amount with which to increase the bid and a maximum amount. The system then automatically raises the bid with the indicated amount whenever someone else places a higher bid, until either the bidder has won the auction or his maximum is reached.

**Reverse auctions.** In a "reverse" or "Dutch" auction, the price is initially set at a very high level, and drops at regular intervals. Participants can pick the price at which they want to buy, and have to determine the chance that someone else will find a higher price acceptable.

In a variant of the reverse auction, customers indicate a product or service and a price, which they are willing to pay. Suppliers indicate a price at which they are willing to provide that product or service, and the auction service tries to match customers and suppliers. The intermediary pockets the difference between the price paid by the customer and the price paid to the supplier. This model is popular with high-priced items like automobiles or airline tickets.

**The virtual mall.** A virtual mall is a site that hosts many merchants, service providers, brokers and other businesses. The virtual mall operator typically charges a fee for setting up and maintaining the merchant's "booth", and for including him in the site-wide catalog. Additionally, he may charge a fee for every transaction the merchant performs. Virtual malls can operate within the context of a larger site, such as a portal.

The virtual mall can act as an intermediary between individual customers and the business it hosts, for instance by facilitating payment and guaranteeing a full refund if a merchant does not deliver in time.

When the virtual mall offers services such as payment facilitation or catalog browsing, it has the ability to create aggregated user profiles on the customers that visit any of the businesses in the mall. This can lead to the development of highly specialized malls (e.g., oriented at kids or sports lovers).

**The virtual community.** A virtual community is a website which has gathered a group of users with a common interest who work together on the site. Typically, users will share information and make contributions in other ways. Since they have contributed to it themselves, users feel highly loyal to the site and will visit it regularly. This offers possibilities for advertising.

Probably the largest virtual community can be found on Slashdot, a Linux-oriented site on which users share interesting news articles and websites (which invariably fail under the load of hundreds of thousands of people visiting it shortly after its URL got posted on Slashdot - this is called "slashdotting").

A specialized type of virtual community is the knowledge network or expert site, where people, layman and expert, share their expertise and experiences. These sites are typically ran like a forum where participants can get questions answered or raise topics for discussion. Long-time participants often meet together in real life. Usenet newsgroups are a good example of such a community.

When a knowledge network is devoted to a particular product or company, the active participation of employees of that company is often very much appreciated and can offer a great PR opportunity for the company.

A simple way to monitor a virtual community is to require registration for access to the website, preferably for free. This allows inter-session tracking of users' site usage patterns and thereby generates data of greater potential value in targeted advertising campaigns. Registration can be made more attractive by offering limited access or "teasers" to unregistered users, by offering the option to customize the site after registration, or by allowing only registered users to actively participate in chat or message boards.

**The infomediary (information intermediary).** An infomediary collects, analyzes and sells information on consumers and their buying behavior to other parties who want to reach those consumers.

Typically, the infomediary offers the consumers something for free, such as free hardware or free Internet access. The later is especially useful, since it allows the infomediary to control and monitor the user's online activities. After all, the consumer connects through the infomediary's network. The information which the infomediary collects is extremely valuable for marketing purposes. Often the

infomediary makes money with an advertising-based model, in which the advertisements are targeted based on the information it collected itself.

The infomediary needs to keep track of its users. A simple way to achieve this is to require registration for access to the website, preferably for free. This allows inter-session tracking of users' site usage patterns and thereby generates data of greater potential value in targeted advertising campaigns. Registration can be made more attractive by offering limited access or "teasers" to unregistered users, by offering the option to customize the site after registration, or by allowing only registered users to actively participate in chat or message boards.

The infomediary model is useful in combination with a virtual community model or virtual mall, since those models offer the ability to collect the necessary information.

### 4.3 The E-Commerce Development And Functional Architecture

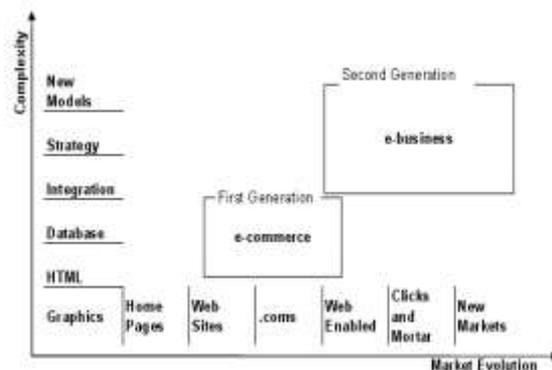
#### The e-commerce/e-business development

E-commerce/e-business is creating tremendous impact on our economy and its subsequent economic rules. The volume of e-commerce as a percentage of the nation's GNI (GBP) grows at an increasing rate. Table 4.1 shows the evolution of e-commerce between 2000 (marked by the beginning of the crash of so called "dot-coms") and 2004.

The nature of e-commerce/e-business is getting more and more complex as the market evolves (see figure 4.9). The elements outlined in the figure axis have been introduced in chapter 1 and will be extended also in chapter 4. Briefly, the first generation – e-Commerce emerged as companies rushed to set up their homepages to claim their web appearances, and the second generation e-business is characterized by the emergence of "mission critical, industrial strength platforms" that support new markets and new models.

It is now widely understood that a successful e-business is built on a business model with a valid value proposition, a clearly defined e-business strategy, and an integrated information technology (IT) infrastructure that facilitates the strategy.

The venue of conducting e-business has also been greatly expanded, especially with the growth of business-to-business (B2B) e-commerce. From implementing individual web-based applications to transforming traditional businesses into click-and-mortar, enterprises are continuously exploring new opportunities and new markets for e-business.



**Figure 4.9 The Market Evolution and Complexity of e-Commerce / e-Business Development**

Source: e-Business Management Models: A Services Perspective and Case Studies, Revere Group, *Todd Miller, Matthew L. Nelson, Stella Ying Shen and Michael J. Shaw*

#### The evolution of e-commerce

Table 4.1 shows the evolution of e-commerce between 2000 (marked by the beginning of the crash of so called "dot-coms") and 2004. The world e-commerce turn-over amount was 6.8 trillion US dollars in 2004 and estimated for 2005 to 8.5 trillion US dollars. According to previous table data USA realizes 47% from total world e-commerce turn-over amount followed by Japan 13%, and Germany 5.7%.

	2000	2001	2002	2003	2004	% of total 2004
Total (\$-billions)	\$657.00	\$1,233.60	\$2,231.20	\$3,979.70	\$6,789.80	8.60%
from which:						
North America	\$509.30	\$908.60	\$1,498.20	\$2,339.00	\$3,456.40	12.80%
USA	\$488.70	\$864.10	\$1,411.30	\$2,187.20	\$3,189.00	13.30%

Canada	\$17.40	\$38.00	\$68.00	\$109.60	\$160.30	9.20%
Mexico	\$3.20	\$6.60	\$15.90	\$42.30	\$107.00	8.40%
Asia Pacific	\$53.70	\$117.20	\$286.60	\$724.20	\$1,649.80	8.00%
Japan	\$31.90	\$64.40	\$146.80	\$363.60	\$880.30	8.40%
Australia	\$5.60	\$14.00	\$36.90	\$96.70	\$207.60	16.40%
Korean	\$5.60	\$14.10	\$39.30	\$100.50	\$205.70	16.40%
West Europe	\$87.40	\$194.80	\$422.10	\$853.30	\$1,533.20	6.00%
Germany	\$20.60	\$46.40	\$102.00	\$211.10	\$386.50	6.50%
England	\$17.20	\$38.50	\$83.20	\$165.60	\$288.80	7.10%
France	\$9.90	\$22.10	\$49.10	\$104.80	\$206.40	5.00%
Italy	\$7.20	\$15.60	\$33.80	\$71.40	\$142.40	4.30%
Holland	\$6.50	\$14.40	\$30.70	\$59.50	\$98.30	9.20%
Latin America	\$3.60	\$6.80	\$13.70	\$31.80	\$81.80	2.40%

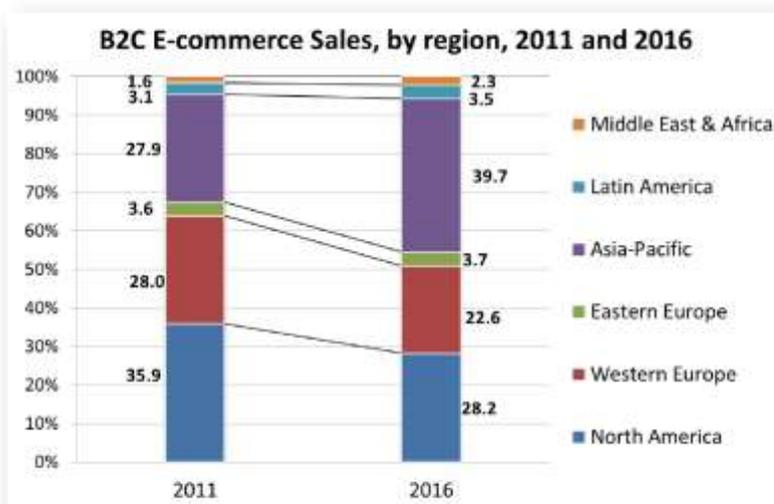
Source: Forrester Research, Inc.

**Table 4.1 The evolution of e-commerce (billion \$)**

The amount of turn-over by regions, in percents is:

Region	Percent
North America	50.90%
Asia/Pacific	24.30%
Europe	22.60%
Latin America	1.20%

Developed economies dominate the market  
*...but emerging economies are expected to catch up*



Sources: eMarketer

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT



(Source: [FT-13])

U.S. Shipments, Sales, Revenues and E-commerce: 2006 and 2005								
[Shipments, sales and revenues are in billions of dollars.]								
Description	Value of Shipments, Sales, or Revenue				Year to Year Percent Change		% Distribution of E-commerce	
	2006		2005		Total	E-commerce	2006	2005
	Total	E-commerce	Total	E-commerce				
<b>Total *</b>	<b>20,912</b>	<b>2,937</b>	<b>19,583</b>	<b>2,579</b>	<b>6.8</b>	<b>13.9</b>	<b>100.0</b>	<b>100.0</b>
<b>B-to-B*</b>	<b>10,605</b>	<b>2,716</b>	<b>9,924</b>	<b>2,393</b>	<b>6.9</b>	<b>13.5</b>	<b>92.5</b>	<b>92.8</b>
Manufacturing	5,020	1,568	4,742	1,344	5.9	16.7	53.4	52.1
Merchant Wholesale	5,585	1,148	5,181	1,049	7.8	9.4	39.1	40.7
Excluding MSBOs <sup>1</sup>	3,909	613	3,586	551	9.0	11.3	20.9	21.4
MSBOs	1,676	535	1,596	498	5.0	7.3	18.2	19.3
<b>B-to-C*</b>	<b>10,307</b>	<b>221</b>	<b>9,659</b>	<b>186</b>	<b>6.7</b>	<b>18.8</b>	<b>7.5</b>	<b>7.2</b>
Retail	3,887	107	3,688	87	5.4	22.0	3.6	3.4
Selected Services	6,420	114	5,971	99	7.5	14.9	3.9	3.8

\* We estimate business-to-business (B-to-B) and business-to-consumer (B-to-C) e-commerce by making several simplifying assumptions: manufacturing and wholesale e-commerce is entirely B-to-B, and retail and service e-commerce is entirely B-to-C. We also ignore definitional differences among shipments, sales, and revenues. The resulting B-to-B and B-to-C estimates, while not directly measured, show that almost all the dollar volume of e-commerce activity involves transactions between businesses. See the "Note to reader" for cautions relating to the interpretation of the "Total" shown here.

<sup>1</sup> Manufacturers' Sales Branches and Offices

Figure 4. 10 The evolution of e-commerce in US (Source: US Census Bureau <http://www.census.gov/>)

Quarter	Retail Sales (millions of dollars)		E-commerce as a Percent of Total	Percent Change From Prior Quarter		Percent Change From Same Quarter A Year Ago	
	Total	E-commerce		Total	E-commerce	Total	E-commerce
	<b>Adjusted<sup>2</sup></b>						
4th quarter 2008(p)	938,052	31,946	3.4	-7.8	-5.7	-9.1	-5.5
3rd quarter 2008(t)	1,017,934	33,873	3.3	-1.5	-1.1	0.2	4.2
2nd quarter 2008	1,033,794	34,237	3.3	0.7	1.8	2.4	-8.3
1st quarter 2008	1,026,876	33,645	3.3	-0.5	-0.4	3.0	13.1
4th quarter 2007(t)	1,032,040	33,793	3.3	1.6	4.0	5.5	19.4
<b>Not Adjusted</b>							
4th quarter 2008(p)	980,135	37,073	3.8	-4.0	17.3	-8.6	-4.9
3rd quarter 2008(t)	1,021,320	31,613	3.1	-2.6	-2.8	0.9	4.6
2nd quarter 2008	1,048,726	32,509	3.1	8.6	0.4	2.3	8.7
1st quarter 2008	965,500	32,383	3.4	-9.9	-16.9	3.7	13.3
4th quarter 2007	1,072,153	38,992	3.6	5.9	29.1	4.9	19.0

Figure 4. 11 Estimated Quarterly U.S. Retail Sales: Total and E-commerce (Source: US Census Bureau <http://www.census.gov/>)

### The functional architecture for e-commerce

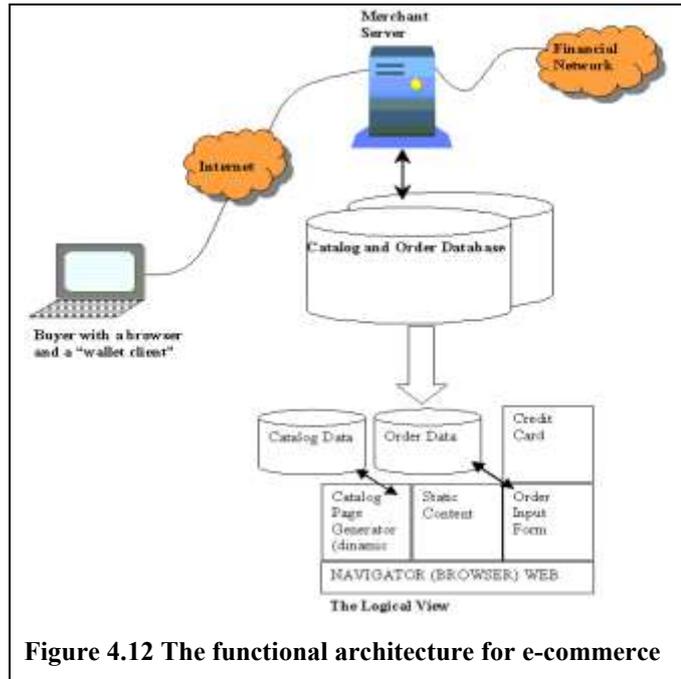
Systems for Internet commerce have many masters. For analysis of architecture we consider four primary components of Internet commerce system (figure 4.12): customer, seller, transaction system, and payment gateway. For each one we present some security considerations.

1) **Customers** (Buyer, Clients) – The client is a computer system, typically a PC, connected directly to Internet via an ISP (Internet Service Provider), or indirectly via a corporate network. The primary tool for using www is a browser (a Web client). It is possible also to access www via specialized applications designed for e-commerce (particular for payments) called wallets. The buyer can be represented by:

- **Retail customer** – the buyer that use the system for business-to-consumer commerce. This category of customers would like to retain their privacy, releasing as little information as possible to sites on the Net. Generally due to commercial interests this information is combined with other sources of data to build up a very detailed picture of the customer. A major interest of this category of customers refers to the security. They want to be assured that their credit card numbers and other sensitive information are adequately protected;

- **Business customers** – the buyers that use Internet commerce systems in the course of their daily jobs (i.e. an administrator reordering office suppliers). For this customers the security required refers to keep their competitors from finding out what they are doing and assuring the integrity of business records in company computer systems;

- 2) **Seller** (Merchant, Vendor) – The computer system or systems containing the merchant’s electronic catalog or products. Sellers include merchants engaged in business-to-business or business-to-consumer commerce or publishers and content providers engaged in information commerce. The seller’s are extremely interested in the integrity of their marketing presence, their prices, their customer records, and their business records;



**Figure 4.12 The functional architecture for e-commerce**

- 3) **Transaction system** – the computer system or systems that process a particular order and which are responsible for payment, record keeping, and other business aspects of transaction. The part for credit card processing system is operated by financial processors that accept transactions from merchants and forward them to the merchant’s bank. Transaction security is a paramount for a financial processor and includes the privacy and accuracy of records, and the authenticity and integrity of requests;
- 4) **Payment gateway** – the computer system or systems that routes payments instruments into existing financial networks such as for credit card authorization and settlement.

The heart of every e-commerce application is its database containing generally the catalog, the buying transactions and the related payments transactions. That heart is the most attractive prize for crackers because generally it stores all your customers' information, possibly even their payment information. The simplest way to assure the protection is to permit access to that database only to authorized users granted to realize specific operations. The access realized on the basis of a username and password, generally from server-side scripts, by using connections strings containing, among other parameters, the following argument types: server name, user name, and password. To protect this vital information follows that rules:

- create a general user to access the database (not from administrators group) having insert, update, and select privileges and use these to define the connection string required to access and manipulate the database records;
- store the connection string in a separate script that will be included as a file when needed;
- encrypt all stored passwords.

For assuring secure electronic transactions Visa and MasterCard joined together (in 1995) to develop the Secure Electronic Transaction (SET) protocol, a technical standard for safeguarding payment card purchases made over open networks. SET is designed to mimic the traditional card transaction flow and in addition it includes the use of public key certificates to authenticate the parties to each other. Figure 4.8 illustrates the changes in the main architecture for e-commerce with SET and table 4.2 shows SET goals and requirements for different category of participants.

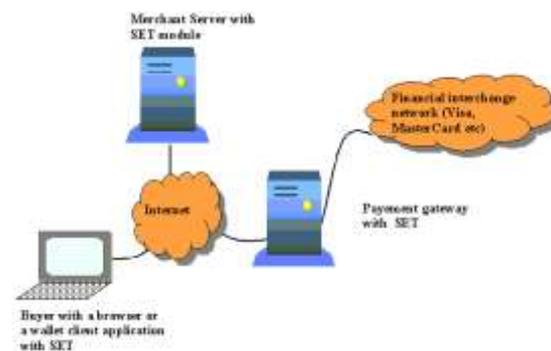
**Table 4.2 SET goals and requirements**

Category	Goals	Requirements
CardHolder	Provide confidentiality of information	Obtain and install cardholder software (wallet)
	Authenticate merchant to cardholder	Obtain SET client certificate

	Improve perception of safety of electronic commerce	
Banks	Reduce merchant fraud Build electronic commerce volume	Implement certificate hierarchy Implement certificate systems for cardholders
Merchants	Easy integration Build electronic commerce volume Reduce transaction costs	Implement SET merchant software

By his nature the HTTP protocol do not ensure any protection for the text information sended or received. There's nothing to stop anybody out there from listening and recording your details. Fortunately, we have other methods that can ensure transactions are secure and that the credit card details and other confidential information are not compromised [HKSU]:

- **Encryption:** the message must be *encoded* before sent to the web server and received back from the web server. The web server has a public key, and users will have a private key that enables them to decode the information. Only having the public key and the private key together will allow you to encrypt the message. The web server will have a public key and its own private key at the other end. To encrypt messages, you use a secure communications protocol. Either Secure Sockets Layer (SSL) or Secure HTTP (HTTPS) would provide this functionality. In Windows environment you can specify encryption methods and whether to use SSL on a connection in the Web.config file.
- **Certificates:** To guarantee that the site you are dealing with at the other end is reputable, it can be certified by a Certificate Authority. Verisign ([www.verisign.com](http://www.verisign.com)) is perhaps the most common Certificate Authority. The authority is paid a yearly fee by the e-commerce vendor and in return, the authority performs checks on the business to prove that it is legitimate. These checks are then recorded in the form of a certificate. You can browse particular sites' certificates during the checkout process. To make your site trustworthy, you should go about obtaining a certificate from a Certificate Authority.



**Figure 4.13 The functional architecture for e-commerce with SET**

The functional architecture with SET changes as depicted in figure 4.13.

The e-commerce creates a “eCommerce platform” ([WB-09],[WB-10]) that enable business, from the three basic blocks of online commerce:

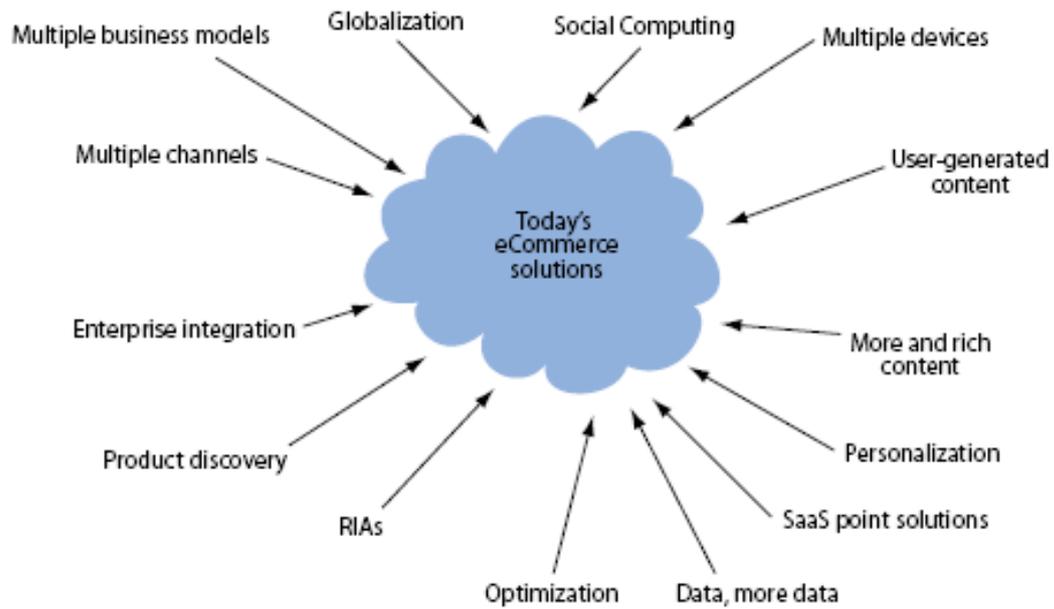
- Catalog – that includes brief/ detailed descriptions of products/ goods, content, and/or services the company sell;
- Customers – that gives access to customers (individuals, in most cases), business, and partners to the catalog and companion activities (such as shopping cart, payments, shipping etc);
- Business Process – that governs the functionality of the e-commerce business given by the business model, the business rules, and value proposition.

The key trends in developing the eCommerce platform as found by FORRESTER are shown in figure 4.14.

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The Key Trends Shaping The eCommerce Platform Of The Future

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Source: Forrester Research, Inc.

(Source [WB-02])

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