

Electronic Business Systems

Modern Enterprise: Design, Manage and Lead

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LIST OF ABBREVIATIONS & GLOSSARY OF TERMS

ADSL	Asymmetric Digital Subscriber Line	LIF	Location Interoperability Forum
AMP	Advanced Mobile Phone Service	Met	Mobile electronic Transaction
ASP	Active Server Pages	MRP	Material Requirement Planning
BPE	Business Process Engineering		
BPR	Business Process Re-Engineering	NYSE	New York Stock Exchange
B-to-B	Business to Business	ODBC	Open Database Connectivity
B-to-C	Business to Consumer	OEM	Original Equipment Manufacturer
CE	Concurrent Engineering	OSI	Open Standard Interconnection
CDM	Code Division Multiple (Access)	PDA	Personal Data Assistant
CSS	Cascading Style Sheet	PDM	Product Data Modelling
DBM	Database Management Systems	PDM	Product Data Management
DOM	Document Object Model	PHP	Hypertext Pre-Processor
DTD	Document Type Definition	PLC	Programmable Logic Controller
EDGE	Enhanced Data Rates for Global Evolution	PSN	Public Switched Network
EDI	Electronic Data Interchange	ROI	Return of Investment
ERP	Enterprise Resource Planning	ROR	Rate on Return
FDM	Frequency Division Multiplexing	SCM	Supply Chain Management
FMS	Flexible Manufacturing System	SDM	Space Division Multiplexing
FTP	File Transfer Protocol	SGML	Standard generalised markup language
GEC	Global e-Commerce	SIM	Subscriber Identity Module
GPRS	General Packet Radio Services	SME	Small to Medium Size Enterprises
GSM	Global Systems for Mobile Communication	SMS	Short Message Service

HDM	Handheld Markup Language	TCP/IP	Transmission Control Protocol/Internet Protocol
HMI	Human Machine Interface	TDM	Time Division Multiplexing
HTM	Hyper Text Markup Language	TLS	Transport Layer Security
HTTP	Hypertext Transfer Protocol	UMTS	Universal Mobile Telecommunication System
ICT	Information and Computing Technology	URL	Universal Resource Locator
IS	Information Systems	WAP	Wireless Application Protocol
ISDN	Internet Services Digital Network	WCDM	Wideband Code Division Multiple Access
ISO	International Standard Organisation	WIM	Wireless Identity Module
ISP	Internet Service Provider	WML	Wireless Markup Language
JIT	Just In Time	WTLS	Wireless Transport Layer Security
JVM	Java Virtual Machine	XML	Extensible Markup Language

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Chapter 1

INTRODUCTION

Evolution of mankind has been entwined with the notion of communication and trade as a result of communal coexistence. With advancement in tools developed by early man, nature was harnessed to improve the quality of life. Civilizations were born where the group of people living together were able to communicate and trade their artefacts, crops, hunted or domesticated animals, and clothing for other necessities of life. With time came professions in which some excelled, artefacts became technologies, knowledge in crops and animal domestication became farming, and equipment and machinery were perfected for clothing. Value adding activities took place on raw material to create a chain of professional inputs for improved quality. Trading and exchange of products became more common and with it the rules and regulations of goods trading practice were developed. Man was able to travel long distances through land and later water and more recently by air to reach the four corners of the world to trade in goods and accumulate wealth. Money was invented as a basis for evaluation of property and wealth with valuable metals i.e. gold, silver and copper or gems as the means. Later for ease of transport paper money replaced valuable metals and gems. Electronic credit finally has solved the last limitations of paper money in daily transactions.

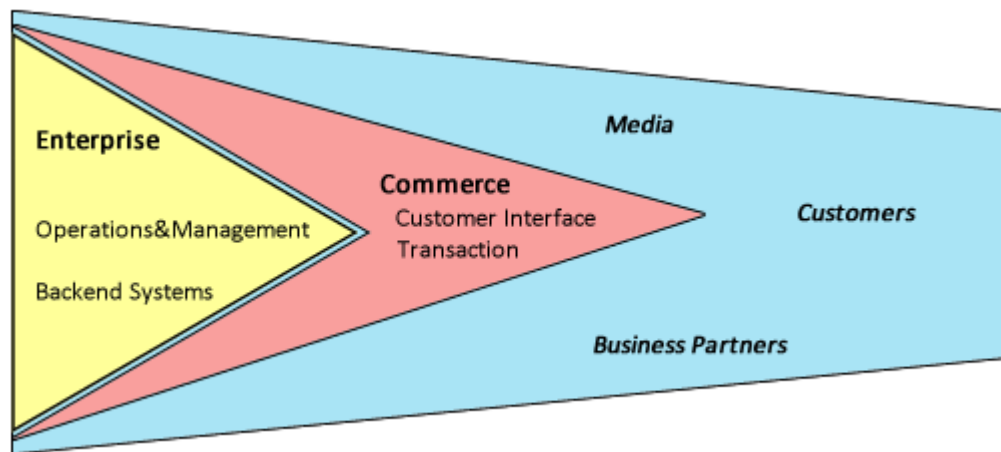
Commerce in modern terminology can be described as exchange and trade of goods, services or information between individuals or companies. Commerce includes the whole process of bidding, transaction, arrangement, and delivery of products. Commerce is conducted through a network of relationships governed by rules and implemented via interfaces. It also requires the identification and the assigning of members and sourcing the responsibilities amongst those members [Keen et al 2000].

The progress in Information, Computing and Telecommunication technologies has revolutionised business transactions and operations. Companies have transformed their internal and external relationships by embedding software and communication technologies to facilitate business processes and operations.

The electronically enabled business is working more efficiently, effectively and with less human errors. The ability to store and exchange data that is accessible close to speed of light has allowed efficient businesses to excel in the provision of their service their customers, given they are individuals (business-to-customer) or other companies (business-to-business).

Electronically enabled business operations have now integrated the front-end operations (interfaces with customers) with backend enterprise processes (internal operations). Figure 1-1 shows a simple diagram of how an electronic business system integrates the backend electronically enabled operations and processes to the commercial level i.e. customer interface and transactions).

Figure 1-1: Electronic Business



1. ELECTRONIC AND MOBILE BUSINESS SYSTEMS

Before we go any further, it is worth noting that some may consider electronic and mobile business (e&m business) systems to be the same as electronic and mobile commerce (e&m commerce). However, in this course and accordance to the latest definitions we believe that e&m commerce is a subset of e&m business. This means that e&m commerce could be a component of any e&m business.

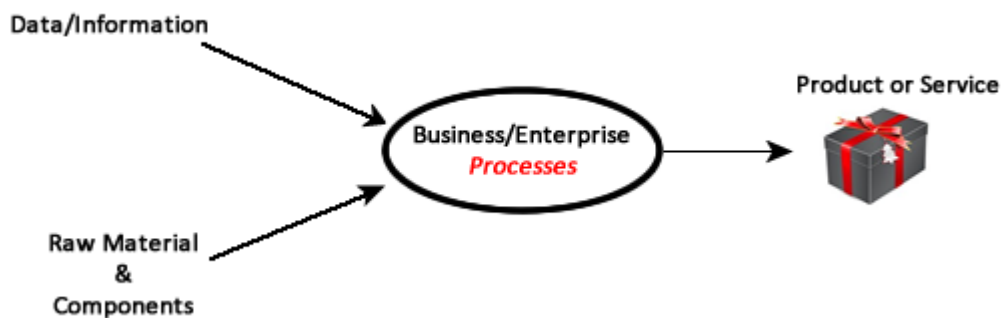
1.1 Electronic and Mobile Business Systems Definition

In this course we define Business System as the combination of processes, operations and

interrelationships that enable a company or group of companies to deliver services or products to their customers or their business partners.

These systems normally put together a set of resources (i.e. people, machines, equipment, computers, communication infrastructure ...) and transform raw material into final products or services. The raw material can be tangible/physical (e.g. fabric, metal, electrical, electronic, chemical ... components) or intangible/non-physical (e.g. data, information). In these systems, the raw material/data (input) undergoes a series of processes and turns into final products (output). The final product is then bought and sold through commercial transactions and rules. The purpose of such systems is to enrich the society or/and generate wealth for the stakeholders. Hence at time they are also called “*Enterprise*”. Therefore, at times we may alternate the two words, *Business* and *Enterprise*, in this book. They mean the same in this course.

Figure 1-2: Business/Enterprise Systems



The prefix of mobile and electronic for business and commerce implies that companies have harnessed the power and capabilities of electronic and communication technology to facilitate business and commercial activities.

“Electronic commerce (e-Commerce) can therefore be defined as the trading of goods and services over computer mediated networks e.g. Internet. The payment or delivery may or may not be made over such a network. e-Commerce differs from the traditional commerce primarily in the way information is exchanged and processed. Instead of being exchanged through direct personal contact, information is transmitted via a digital network” [Statistics in focus, Industry,

In other words, software and hardware technologies in the form of software applications, Data Base Management Systems (DBMS), telecommunications, network protocols, Enterprise Resource Planning, security systems, and servers are put together to emulate business and commercial operations. The integration of all these tools and technologies creates a platform for a successful implementation of electronic business and commerce.

1.2 Origins of e-Commerce

Electronic Data Interchange (EDI) may be considered as the origin of modern e-Commerce which has regularly been adopted in retail and automotive industries to address application-to-application interactions. These applications range from browsing inventory database for a specific part in a manufacturing plant to reservation of seats for flight tickets. These systems normally required heavy investments on specialist software and hardware and were peer-to-peer connections. At the beginning, EDI could not be widely used in all sectors due to heavy investments in hardware, software and networking. With the explosive developments in the Internet technology and the World Wide Web e-Commerce has become more economic and accessible. The flexibility of Internet has made the technology easy and cheap to develop and maintain.

The integration of modern communication and information technology with the enterprises' existing information systems (IS) has provided the infrastructure for global e-Commerce. The technology has been utilised to create competitive advantages for enterprises by facilitating worldwide communications and collaborations among buyers and business partners [Hackney et al 2000].

1.3 Growth of e-Commerce

With the introduction of Internet technology, business relations have become more dynamic, further collaborations between companies are enabled, and the added value due to flow of information in the value chain have been realised. The macro economic trend of globalisation, increase in computing and communication speed, coupled with the expansion of networked connections between companies and people have contributed to the growth of e-

Commerce.

People's lifestyle and habits have changed with the growth in mobility and electronic data exchange. Individuals and companies strive to become members of the global information system and will be connected, leading to national and international exchange of (electronic) commodities and information [Timmers 2000]. With the aid of electronics technology and using nearly unlimited bandwidths that offer unlimited access with minimal cost the physical barriers to transfer information and money is meaningless. However, there is still a problem with physical commodities which have to be transferred through conventional methods e.g. transport systems.

Transactions in m & e commerce can be between companies, Business-to-Business (B2B), Business-to-Consumer (B2C), or Consumer-to-Consumer (C2C) [Stair et al 2012], the so-called *"relationship models"*.

In the B2B relationship model, companies interact with one another or join forces to provide better services or products. With advent of Cloud Computing, many resources from software to data base management systems to physical buildings and warehouses can be shared and utilised by multiple companies. These companies can then build strategic or opportunistic alliances to add value and improve services to their customers.

The typical B2C relationship model are the ones that we are most familiar with and are the ones that offer services or products to consumers directly. Online travel agencies, shops and media (newspapers, journals, magazines ...) are examples of such models.

Finally, the C2C which is enjoying a huge following are the ones that have been created by communities and people who share values, ideas, events, and also goods. One-to-one recycling/exchanging of goods, auctions, share schemes etc. are some examples to mention.

1.4 The Competitive edge of Mobile & Electronic Business and Commerce

Mobile and electronic Business and Commerce provides a perfect platform for competition in a sense that:

- Barriers to entry are lowered.
- Transactions costs are reduced.
- Customers have improved access to information in real-time.
- Marginal or customer-oriented pricing becomes possible.
- Convenience for buyers of service.
- Service and product providers have direct access to the customers.
- Utilisation of the power of social networks and community building around services, products and brands.
- Efficient and effective business, through electronically enabled operations – lesser errors and quicker responses.

And in order to be successful as an electronic commerce provider it is essential to:

- build a **Community** around your product,
- provide rich trading **Content** such as catalogues and manuals, and
- **Control** the system and the process [Timmers 2000].
- **Continuously Update and Upgrade** your technology to ensure maximum efficiency.

2. THE WORLD WIDE WEB (WWW)

e-Commerce owes its success to the development in WWW technologies. The technology was developed in 1993 by Mosaic at the National Centre for Super-Computing Applications in the USA by Marc Andreessen (the founder of Netscape) [Westland et al 2000]. Mosaic is a network browser (searcher) software program that searches in a network for chunks of information. Mosaic combined the idea of World Wide Web [Berners Lee 1980] with the

emphasis of hypertext organisation (HTTP& HTML) of the web as an organising concept for information. The rapid growth in Internet commercialisation and the graphical user interface facilities envisaged in Mosaic marked the creation of e-Commerce. Electronic commerce existed on the Internet in limited forms prior to the introduction of the web protocols, for example USENET posted messages and e-mail based transactions. However, the use of Internet for commercial purposes was insignificant prior to introduction of Mosaic [Westland et al 2000].

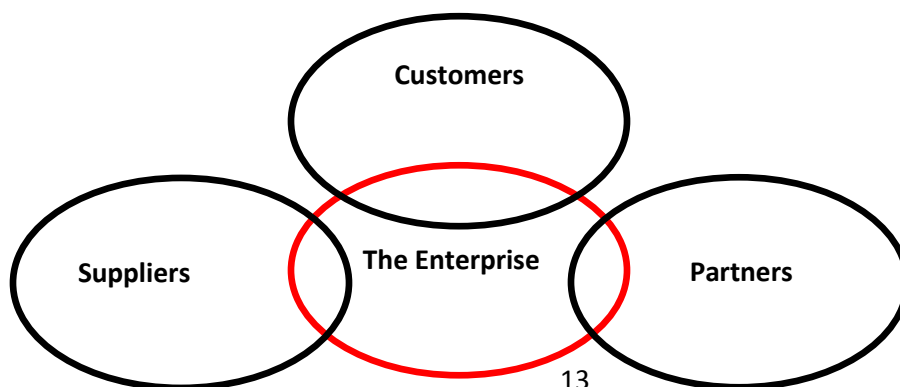
The Internet was originally developed for military communication systems based on non-failure reliable packet switching which allowed message encryption, tracking, and efficient usage of networks. The web built on the powerful Internet concept was an instant success. The world owes the economic boom of the 90s mainly to the success of WWW [Westland et al 2000].

The mechanisms, protocols, procedures, hyper-linkages, enabling software, etc. developed for the Web, have had significant impact on telecommunications network. It has enriched the network in a sense that not only does it offer access to information but also adds value by combining, filtering and integrating information with a worldwide repository of knowledge.

2.1 The WWW and Value network

M& E Commerce involves the complex network of interrelationships between an enterprise, its customers, its suppliers, intermediaries and partners. Coupled with a business model the networking criteria in e-Commerce clearly define the tasks and relationships between these elements that create the value chain. If the enterprise is considered to be the value centre there are four sets of relationships that complement the value chain. Figure 1.3 shows the value network in e-Commerce and the relationships.

Figure 1.3: Value network in e-Commerce (also see Keen et al 2000)



The Enterprise: The enterprise is the heart of the network where all the functions and activities are masterminded and controlled. The enterprise is the integrator of the network. The enterprise should be constructed and organised in a manner that the business process functions as smooth as possible. Information flow, linkages, production/service process, data management, and sourcing should be done fast and efficiently. A bad organisation will lead to collapse of the value network and will cost the business dearly.

The Customers: The customer of such an enterprise from the context of value networks can be individuals or other companies pending the relationship model between the enterprise and the external entities they are dealing with.

Business Partners and Suppliers: Intermediaries consist of strategic and temporary business partners that aid the enterprise in meeting customer needs. These intermediaries can be research institutes where market forecasts, customer satisfaction, economic analyses are conducted. Sales intermediaries extend the enterprises market horizon e.g. resellers, distributors, agents, value added partners and channel partners/resellers. Logistics intermediaries, as the name implies, ensure enterprises sources are intact and necessary material are supplied. Technical intermediaries are the ones who supply the enterprise by latest updates and software technologies required to keep up with the ever changing and improving IS.

Can you imagine or visualise how a typical company like Amazon.com value network would look like?

2.2 Sustainability of e-Commerce

The new viability of e-Commerce is due to the developments in firstly, e-Commerce platforms such as television, electronic kiosks, computer networks, microcomputers, PDAs, and smart mobile phones affordability, accessibility and user friendliness. Advanced electronic commerce platforms are emerging and evolving with mechanisms for mobile and electronic trading, retailing, advertising, and secure payments. Secondly, advancements in networking and wireless technology have increased flexibility, reduced response time, and accelerated

operations. Thirdly, the automation and engineering of business processes of firms has moulded in with the advancements computational and communication technologies both in the form of wired and most importantly wireless.

All these factors contribute to the recurring improvements and optimisation along the lifecycle of Internet technology maintaining its agility and sustainability to meet the ever-increasing demands of modern enterprises.

Moreover, mobile and electronically enabled businesses are utilising the continuous improvement in hardware and software technologies that are optimising energy consumption and pollutant emissions. Greener businesses are emerging and replacing inefficient high energy and pollution producing traditional operations.

SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *What is meant by Mobile and Electronic Business? What is meant by Mobile and Electronic Commerce? What is the relationship between the two?*
2. *What are the three types of business relationship models? How are they enabled electronically?*
3. *Is Mobile and Electronic Business and Commerce growing? Explain your answer.*
4. *Why do you think m&e commerce provides a competitive edge to companies?*
5. *Describe Value Network in m&e commerce.*
6. *Why do you think m&e commerce is sustainable?*

Chapter 2

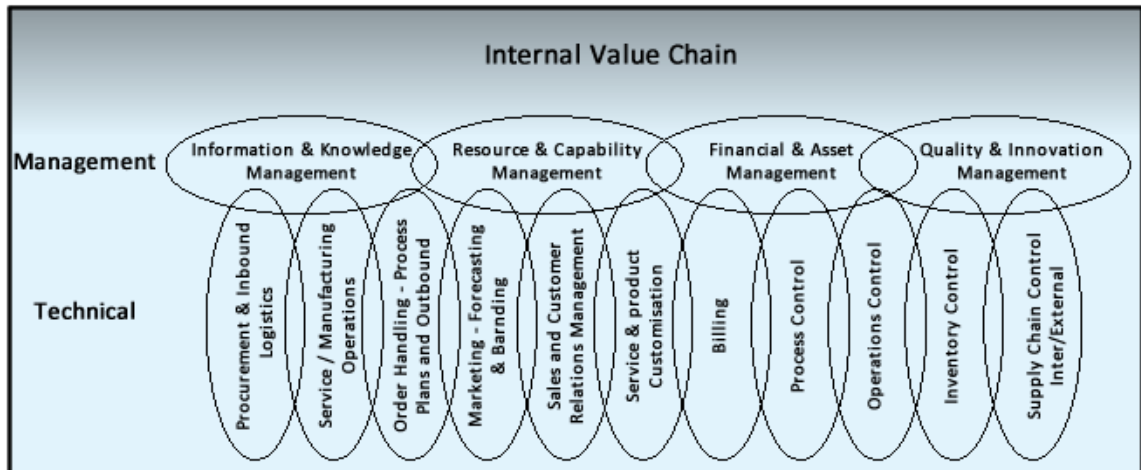
ENGINEERING AND MANGAMENT OF BUSINESS PROCESSES

In this chapter we discuss the engineering and management of business processes. We discuss the key components that define business processes, how they are made (engineered) and how they are managed to achieve strategic objectives of the company.

1. BUSINESS PROCESS ENGINEERING AND RE-ENGINEERING

The chain of processes and activities involved within a company to deliver products and services to its customers can be referred to as the company's "internal value chain" [Westland 2000]. Figure 2.1 shows an internal value chain.

Figure 2.1: Internal value chain for typical business system



The design, configuration and establishment of the internal value chain in a company are called "Business Process Engineering (BPE)". Businesses utilise information and communication technologies to improve efficiency, reduce cycle time, and optimise customer relationship. Sustainable business systems need to be prepared for changes in the environments and customer needs. They should be able to predict and adapt to the socio-economic and political changes that occur around them. The sustainability can only be guaranteed if the company has

the capabilities to configure and reconfigure its internal value chain and external relationships. This reconfiguration is called "*Business Process Re-engineering (BPR)*"

BPR is about "*Fundamental rethinking and radical design of business processes to achieve dramatic improvements in critical contemporary measures of performance such as, cost, quality service and speed*" [Goodman 1998].

BPR is a strategic response to a complex and dynamic business environment and is widely recognised in the academic and business literature. The emergence of BPR is the direct result of companies' responsiveness to the fast changes in market and business culture.

In view of the evolving interactivity, networking, multimedia, data processing features of the Internet and Communication technologies, questions to be answered for a company to implement m & e Commerce are: What are the emerging business models? Which business strategies are applied or emerging? What are the related marketing programs? What are the likely future scenarios for B-to-B, B-to-C and C-to-C electronic commerce?

By scrutinising Figure 2.1 we can identify two distinct but interlinked layers in the company, the *Technical* and the *Management* layers. At the management level the overall company strategies, targets and directions are set. At this level:

- The *Information and Knowledge* required for setting the agenda and directions for the company is analysed and interpreted. The technical infrastructure and people will be responsible to produce the data and information using the ICT infrastructure. The technical people in the company will install, create and maintain the data acquisition points, data storage and management, data mining, and translation into key performance indicators (KPI). The processed information on various company activities (i.e. Procurement, Operations, Order Handling, Marketing, Product Customisation, Customer Relationship, Billing, Process/Supply Chain/Inventory Control) will then be reported to the management level in the form of KPI metrics.

- The *Resources and Capability Management*, based on the nature of the service/product provision the company needs to assess and possess the necessary capabilities in the form of human resources, equipment and software/hardware. The management in conjunction with the technical staff need to establish the capabilities that enable the company to smoothly and without major shortcomings meet customer needs.
- The *Financial and Asset Management*, the management of the company is responsible to ensure that the company has got sufficient finance and asset portfolio to run commercial operations. It is vital that the company has the means to monitor its financial condition at any time (in real-time) and forecast the trend of availability of funds to fulfil its obligations. These obligations are to its staff, stakeholders, partners, and most importantly customers. Any miscalculation can have detrimental impact on the company's operations and reputation.
- The *Quality and Innovation Management*, a viable enterprise needs to be able to monitor and continuously improve the quality of its service provision and products. Quality assurance is intertwined with innovation and adjustment to the ever changing commercial environment. The technical infrastructure should be capable of acquiring customer needs and translate them into technical specifications, so that the final product is always to the taste and the requirements of the customers. Embedding techniques such as Total Quality Management (TQM), Six Sigma, Quality Function Deployment (QFD), Customer Optimisation Route and Evaluation (CORE) ... are some of the examples. **I recommend you to research and understand these concepts as further reading for this chapter.**

2. KEY CHARACTERISTICS OF THE INTERNET AND WORLD-WIDE-WEB AND THEIR INFLUENCE ON BUINESS AND COMMERCE

One can list the key features of Internet for commerce as [Timmers 2000]:

- Availability: Time constraints prevailing in traditional 9-5 businesses do not exist. With online 24 hours 7 days a week immediate Internet access transactions / auctions /

exhibitions of products is possible round the clock.

- *Omnipresent:* Internet access is and will continue to be part of every business facility, just as fax machines, telephones and computers have become.
- *Global Accessibility:* With no physical boundaries there are no limitations for access from around the world. Business partners and customers can access information of products from the four corners of the globe.
- *Local Accessibility:* Internet not only facilitates global commerce it also creates a perfect platform to reinforce local presence and person-to-person relationships. Customised websites, e-mail services, SMS for mobile users and user profiles (Cookies) have all contributed to reinforce local presence.
- *Digitisation:* The business happens in information space even for physical products. Thus improving speed and efficiency in business transactions.
- *Multimedia:* A suite of technology have been combined together to offer business a competitive, more interactive, and entertaining edge during buying and selling products.
- *Interactivity:* It is a challenging task to replace face-to-face business relationship with a virtual one. Internet technology should create an opportunity for improvement in customer service at an affordable price.
- *One-to-One:* Customer profiling and close interactivity enables a strong one-to-one marketing tool that will enhance business on the Internet.
- *Networking effect:* With new businesses joining the WWW the opportunity to connect with others and develop business networks is phenomenal. Various industries can create open markets for virtual communities and third-party marketplaces.
- *Integration:* The Internet technology provides the basis for value-chain functions and information integration. Advanced e-Commerce companies are successful in exploiting

this technology for added value.

3. MARKETING STRATEGIES AND PLANS

B-to-B industrial or organisational markets are the types of markets that individual or groups of businesses purchase or sell specific type of products/services/information. These products/services/ information are then used for resale or for marketing other products or for daily operations [Dibb et al 1991, Timmers 2000].

Characteristics of B-to-B and B-to-C markets can be summarised as:

- Customisation: Products are tailored to customer requirements.
- Knowledge: Knowledge-based interactions with professional customers. The retailer should be well informed about the product.
- Personal: Bi-directional relationship with customers, direct interaction between seller and buyer alongside the distributors and resellers.
- Professional: Special promotions via brochures, datasheets, videos, tradeshow, and exhibitions.
- Negotiations: Possibility of negotiations on price, product specifications, delivery time, and payment arrangements.
- Multi-party: Possibility of a number of purchaser being involved in the buying process that can be complex and may require extensive procedures.
- Multi-channel: Manufacturers may have different channels to supply different customers e.g. direct sales, agents, distributors, and wholesalers; where there may be conflicting interests amongst business partners.
- International: Globalisation and international trade requires its own regulations, different languages, and measures to appreciate diversity of cultures.

4. PRE-REQUISITES FOR STRATEGY DEVELOPMENT IN E-COMMERCE

1.1 Quality of Market Research:

To date there has not been a single accepted method to measure or evaluate e-Commerce performance. A systematic approach to evaluation of electronic commerce seems necessary. Parameters such as market size, e-Commerce growth, number of organisations and individuals joining the WWW, as well as quality and quantity of infrastructure for Internet technology need be studied [Timmers 2000]. Sound market research will ensure that the capabilities of the system are utilised to target specific customer groups with well-defined and achievable targets.

1.2 Dynamics of technology and growth of e-Commerce:

Internet technology picked up momentum with the invention of the World-Wide-Web in the early 90s. The subsequent development of browsers Mosaic, Netscape and Explorer enabled PC based systems to go on the network of computers. This technology combined with world-wide accepted PC-to-PC communication protocols TCP/IP gives access in a uniform and simple way to the Internet as a network of networks, with a straightforward visual way to access information from any of these sources [Timmers 2000].

1.3 Creation of a global legal framework for the digital economy [Timmers 2000]:

Absence of a legal regime in Internet technology has made companies reluctant to join the e-Commerce club. A universal legal system needs to be developed to safeguard flow of information, data protection, intellectual property rights, liability, harmful content, consumer protection and other aspects of information dissemination.

1.4 Strategy Development:

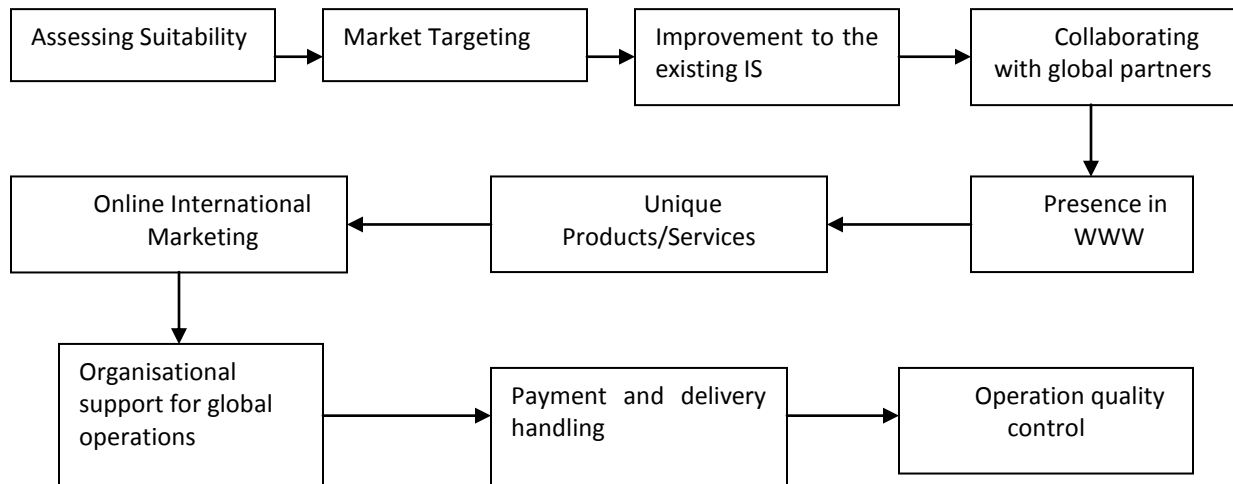
There are four approaches to developing electronic commerce, *Classical*, *Evolutionary*, *Processual*, and *Systemic* [Timmers 2000]. The *Classical* approach focuses on technology oriented planning with allocation of resources to conduct a task. *Evolutionary* approach is based on the Darwinian approach of survival of the fittest. With emergence of different initiatives markets will select the most suitable. *Processual* approach refers to the political view on the process of strategy development. This approach is behaviourally oriented with the assumption

that human rationale is limited and decision-making is a matter of trial and error. The choice of strategy is consequently a political process. The *Systemic* approach believes that the development of strategy is based on the relationship between a set of factors. It is similar to the classical approach with the regards to the planning aspects even in complex situations. But contrary to the classical approach relates more to history and context [Timmers 2000].

5. GLOBAL M&E COMMERCE (GEC) PROCESS

With the integration of Communication and Information technology and companies' internal IS, GEC has been facilitated. Advancement in wireless technology and mobile systems enables business transactions to penetrate the most remote potential markets. The GEC process model can be summarised in Figure 2.3.

Figure 2.2: GEC process [Hackney 2000]



5.1 Assessment for suitability to join global e-Commerce

There are a number of attributes that should be considered for assessing a company's readiness to join the global e-Commerce (GEC). Depending on the market and product type these attributes may be listed as:

- **Product Characteristics:** Customisation, ensuring highest possible customer satisfaction during product life cycle.
- **Online marketing capability:** Presence of a sound IT infrastructure and in-house skills, ability to promote the product, branding to ensure customer loyalty, offer lowest possible price to the customer, and maintaining flexibility and adaptability of logistics.
- **Systems capability:** Ensuring that the system is capable of meeting its commitments. The technical know-how, facilities and resources are in existence.
- **Managerial capacity:** Management knowledge for international commerce, creativity, ability to coordinate international business, and desire to train and acquire the needed skills.
- **Commitment to research and development R&D:** Willingness to invest in market research and product research for constant improvement [Hackney/Nazmun Nahar 2000].

5.2 Selection of Target Market

In order to launch a successful GEC comprehensive research into international markets should take place. The potential target market, size, sales share, competitors, IT infrastructure, political and social factors, and unique characteristics of the market should all be considered.

5.3 Producing unique products and services

A comprehensive website capable of collecting customers' personal information, product requirements, and the importance level for each product attribute (see chapter 6) should be developed. This information will be stored in relational or object-oriented databases to be used for product customisation.

5.4 Online international marketing communication

There are several effective low cost marketing tools and network services available in the WWW. Amongst these tools and modes are: registering company website on local search

engines, exchange of links between websites, subscription and sponsorship of journals, magazines and press releases.

5.5 Organisational supports to global operations

In order to maintain global presence the company should support and invest in regionalising and customising its marketing facilities. Websites for local and regional markets, proper documentations by considering local legislations should be designed by GEC trained and internationally experienced people.

5.6 Payment and delivery handling

The enterprise should be capable of accommodating various modes of monetary transactions. Credit cards and credit checking are well-established modes of transactions. However, for large transactions credit cards are not suitable and in some countries yet to become functional.

6. CHANNELS AND INTERMEDIARIES

In order for a business channel to function and succeed the following attributes need to be observed [Westland 2000]:

1. Inventory control: In order to maintain service standards and quality it is important to maintain sufficient levels of inventory to respond to customer needs. The level of inventory depends on the company's strategy in distribution, replenishment and storage of the products.
2. Ownership: Is the most challenging legal aspect of e-Commerce. Identification of physical property is quite straightforward. For example you own your house and there are physical evidence to it. But in a virtual world of electronic technology, where assets such as information can be virtual, ownership protection can be very difficult. Stronger protection rights are being developed and will come into force to define ownership in the Internet era.
3. Product promotion: With inventions and innovations in the use of WWW companies can advertise and promote their products effectively. The use of online graphics,

multimedia, and advertising constructs has created web pages that enhance corporate image, promote products, and provide customer feedback. Such features create relationships and customer loyalty.

4. Customisation: Successful products where price, options, and after sale services can be tailored to customer requirements are features that should be incorporated and observed in e-business. Online acquisition of information regarding customers' satisfaction towards product attributes is an important factor in customisation.
5. Market Information: Market research, sales projection, scenario generation, and risk analysis all aid in production planning and inventory control for channel makers.
6. Financing: Financial advice will be necessary for expensive products. For example to purchase a car or a house, buyers will require specialised financing facilities such as loans and mortgage offers by lenders and building societies, whilst for lesser expensive goods credit card will be sufficient. An efficient website should be capable of linking financial service providers with their websites.
7. Payments: Payments must be made if the producers and intermediaries are to survive. It is necessary to move from cash transactions to electronic transactions in developed economies. Credit and debit cards transactions have contributed to the success of e-Commerce.
8. Risk bearing and insurance: Risk bearing and insurance may be necessary in cases of long production cycles, or high investments requirement, or when significant liability is incurred.

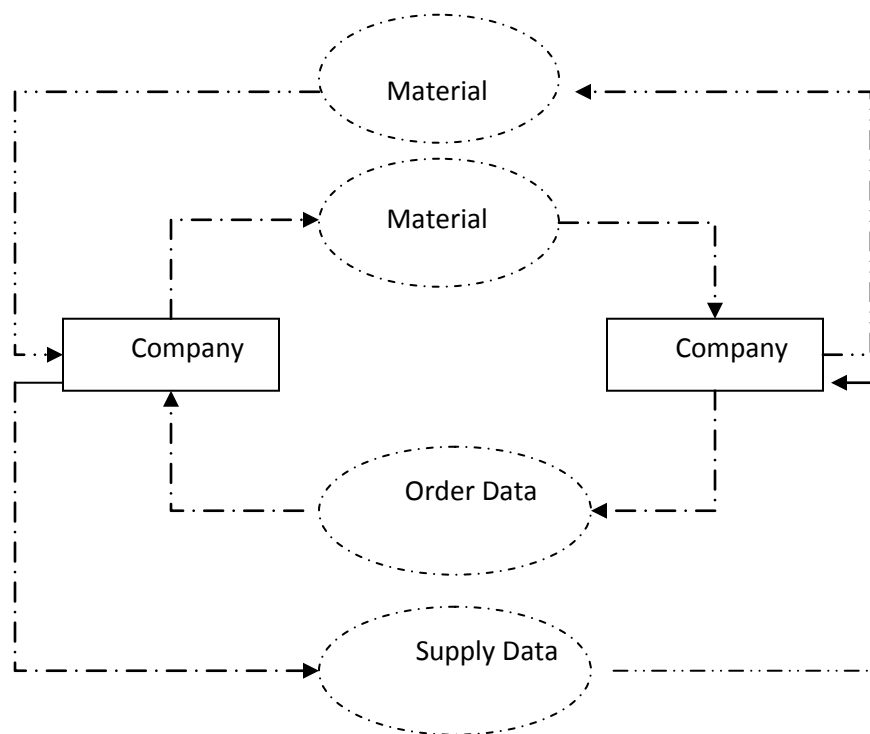
7. SUPPLY CHAIN MANAGEMENT AND IT

Supply Chain Management (SCM) involves the coordination and control of electronic B-to-B linkages. One of the businesses acts as customer and the other as supplier within a single industry supply chain. The roles may change from project to project, for example company A orders raw material for manufacturing a product, using company B as a supplier of material in the supply chain. In another transaction company B will be a customer for information on

market behaviour from company A. It will use company A's forecasting to control its stocks. The network of industries in the supply chain will give competitive advantage over other low cost players in the market.

Internet technology can create an online data exchange system in real-time within the supply chain to reduce lead-times and realise a just-in-time (JIT) approach. Wireless technology can even push the limits further by letting individuals update information on site in real-time where they conduct business transactions with customers and business partners. Figure 2.4 shows a simplified two node supply chain and how either partner can be supplier or customer to the other partner.

Figure 2.3: Schematic view of a simple two node supply chain



SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *What is meant by Business Process Engineering and Re-engineering?*
2. *Explain the various levels and building blocks of the Internal Value Chain, use*

Figure 2.1 for your answer?

3. *What are the key characteristics of the WWW and the Internet? How can it influence modern business and commerce?*
4. *In order to establish a solid marketing strategy for B-to-B and B-to-C commerce, explain the key characteristics that need to be observed?*
5. *An online toy manufacturing and sales company wishes to establish an internal value chain with all the operational elements and management channels. Draw a value chain diagram that covers both the technical and the managerial levels. Advise the company on the key elements of m&e commerce strategy.*
6. *In the Q5 case, what would you recommend for global m&e Commerce Processes?*

Chapter 3

BUSINESS MODELS

This chapter discusses electronic business (e-business) models from a systems perspective. The main purpose is to introduce systems ideas in a way that electronic business models can be described in their full life cycles i.e. from birth of an *idea* to *maturity*. We will attempt to discuss the issues that concern designers, developers and trouble-shooters. We will use systemic metaphors to establish a platform for creative and organised thinking in which, one can identify the various elements and their interactions in an e- business environment.

By reading this chapter you will be able to:

- Describe a range of electronic and wireless business models,
- Distinguish between various existing models,
- Plan, design and operate an electronic business system to specification,
- Solve problems arising at different stages of the e-business life cycle, and
- Evaluate e-business systems from both consumer and business perspectives.

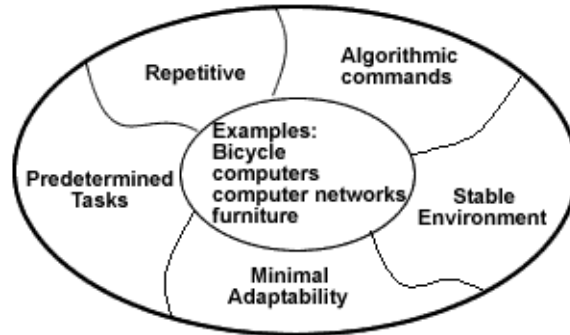
1. ELECTRONIC SYSTEM

The three schools of thoughts that have contributed to the definition of systems can be described as: The *Mechanists*, *Organists* and *Holists*.

The Mechanists define system as an aggregation of parts where the whole is equal to the sum of parts. This definition mainly describes mechanical systems where machine as a technical apparatus consists of standard parts with defined relationship between the parts. Imagine a bicycle, the emphasis is mainly on the performance of each part where predetermined and repetitive functions implement specified operations. The main characteristics of such “closed systems” are illustrated in figure 3.1.

Figure 3.1: Main characteristics of “closed systems”

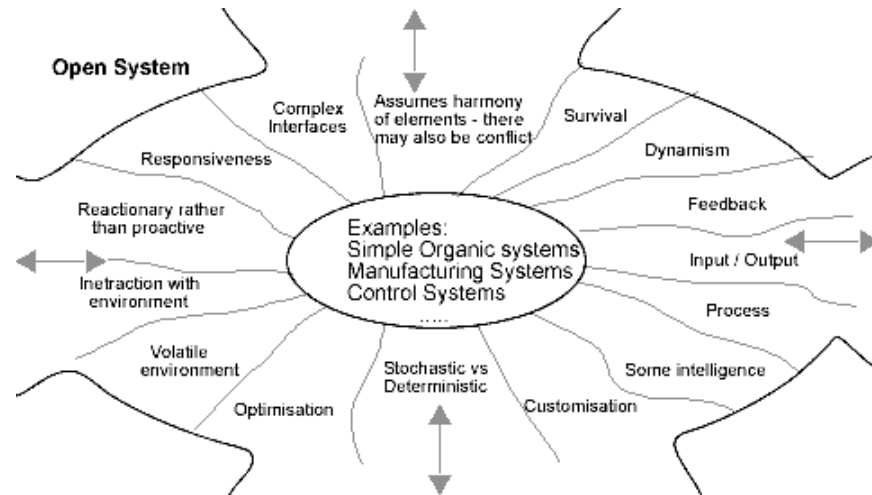
Mechanical System



Theories of bureaucracy by Weber and scientific management by Taylor tend to describe organisations from a mechanistic perspective. The first challenges to the mechanistic view of organisations came from human relation theorists. It argued that respect for social and psychological needs of people will improve the effectiveness and efficiency of operations.

The *Organists* describe a system as a set of interlinked elements with synergetic properties. The whole is greater than simply the sum of constituent elements. These systems continuously interact with the outside world (open systems). By describing organisms, the system theorists explained the notion of adaptation and survival in complex situations. These systems receive input e.g. energy and raw material and based on the logic prevailing, performs a process of turning raw material into final products (output). Customer orientation as a strategy for survival is an important factor for these systems. The main characteristics of “open systems” are shown in figure 3.2.

Figure 3.2: Characteristics of “open systems

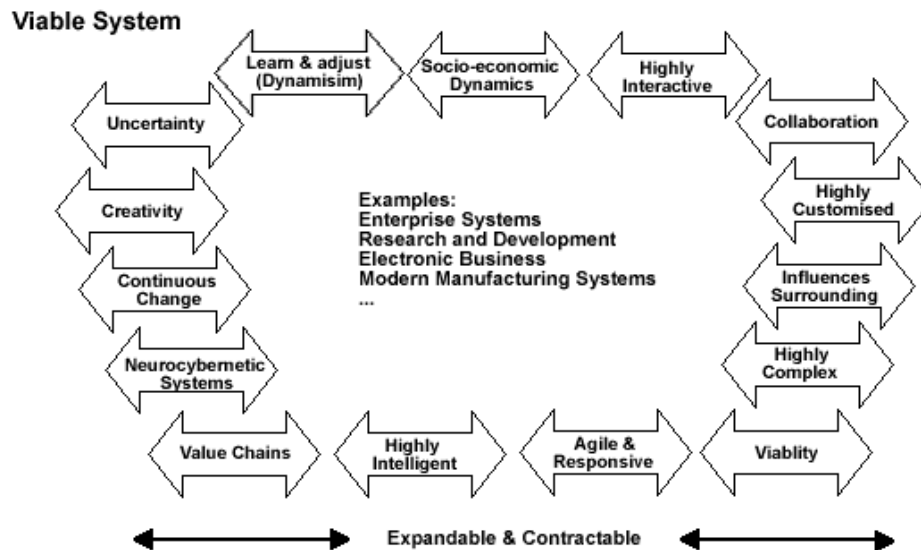


Organists' definition of open systems solved some of the issues concerning analysis of dynamical systems, however, this was not sufficient. The more complex socio-economical and viability issues also needed to be considered.

The *Holists* take the concept of “viable systems” as interacting networks that in addition to their constituent elements govern the complex interactions between functional, socio-economical, cultural and political elements. Holistic systems emphasise aggressive prediction, active learning and control. It surpasses the idea of open systems adaptability and survival philosophy. It focuses on data acquisition, information processing and viability. Such systems not only take all necessary measures to adapt to the sudden changes in their environments, but also try to influence and change the environment to their advantage. A viable system as part of its model considers the values and beliefs (culture) and identifies the social norms and political tendencies of the society. A prime example is the modern enterprise systems where dynamics of global economy and political interactions coupled with market requirements have resulted into dynamic systems that reinvent themselves to accommodate for global changes.

Figure 3.3 describes the characteristics of a “viable system”.

Figure 3.3: Characteristics of “viable systems”



The modern representation of electronic enterprise systems are well defined by the *viable system* concept. They encompass all aspects of such systems with the added feature of electronically enabled networks and information processing. This chapter will help us identify the elements of complex business systems and describe the relationship between those elements. It will offer guidelines for modelling and designing business system to specification. We will use already existing models to further elaborate on how these systems function and could sustain in their volatile environments.

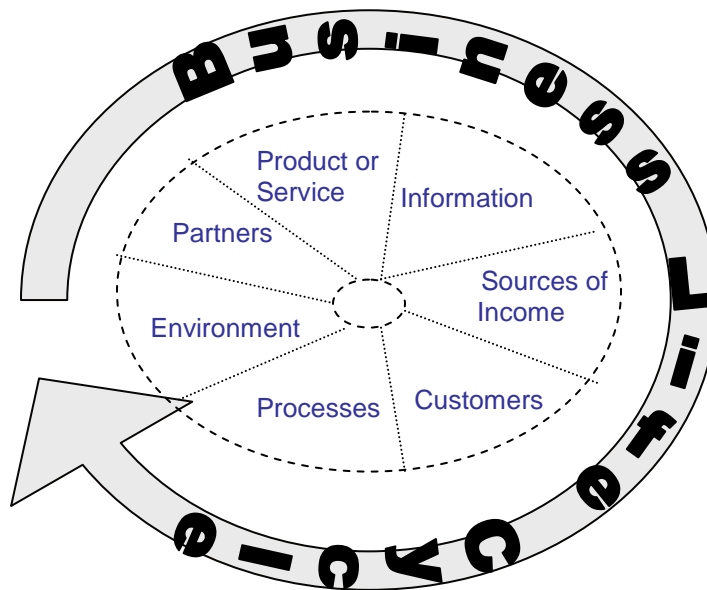
In an ideal situation, the complex interrelationship between every physical, biological, environmental, and socio-economical element should be considered. In reality this is almost impossible. The only way to make any progress is to use abstract modelling. Abstract modelling will consciously reduce the number of variables but provides a platform for creative systems design. Business models as discussed here are representations of real business systems.

2. ELECTRONIC BUSINESS MODELS

The dynamics of electronic business models require a comprehensive appreciation of:

- The nature of the product or service to be delivered by the system.
- The constituent elements their role within the business chain including resources and other business partners. The logical linkage and flow of information between these elements.
- The nature of raw material which may mainly be in electronic format. Processing the data and producing meaningful information.
- Sources of revenue (Timmers 2000) how to generate wealth and provide services and products according to customer (internal or external) demand.
- The environment in which the business is conducted.
- Business life cycle: birth, growth, maturity, sustainability and end.

Figure 3.4: Business model and its life cycle

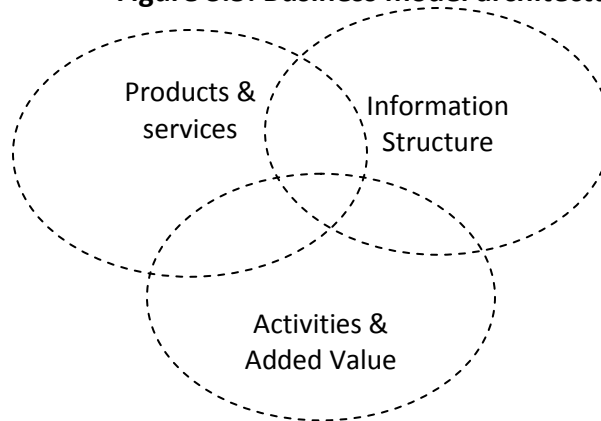


3. ELECTRONIC BUSINESS MODEL ARCHITECTURE

The main achievement and the future direction of electronic enterprise systems revolve around their customers. To provide a sound platform for a successful electronic business, the architecture of the business model should represent:

- I. Product or service that is going to be provided,
- II. The information structure and flow – analysis of the digital construct with respect to the networks and responsibilities of each node,
- III. Activities and added value – involvements, other players, various support activities and the role of players in the value chain.

Figure 3.5: Business model architecture



The business modeller should give *identity*, *brand* and assess capability of the organisation by:

- I. Setting the mission and goals (identity),
- II. Developing plans for the electronic organisation to cope with dynamic objectives and maintain high quality of service (brand), and
- III. Carrying out an analysis of the purpose and the synergic qualities of the existing or planned departments within the organisation (assess capability).

4. ELECTRONIC BUSINESS MODELS QUESTIONS TO BE ADDRESSED

Electronic Business models should answer the following questions:

- I. What is the organisation going to gain through electronic network and presence on the WWW?
- II. What are the benefits for the business associates and partners?
- III. Is it going to be sustainable?

- IV. What are the associated risks?
- V. Who does what?
- VI. What are the inherent capabilities of the organisation?

5. BUSINESS MODEL SOURCES OF REVENUE

The importance of identifying the sources of revenue for a viable electronic business system cannot be emphasised more. A number of factors needs to be considered in identifying sources of revenue can be listed as:

Target Market (Global vs. Local): The business model should clearly identify the target market. Who are the main customers of the provided service or product? What are their preferences? We need to be fully aware of the market and fashion trends and consumer behaviour. It is vital to be able to evaluate customer satisfaction towards already existing products or services. The global market can be different from local markets, it is therefore important to observe cultural trends and possibly language differences. A customised presentation may always be to the advantage of the business.

Market Research and Strategy: The business model needs to be based on a comprehensive market research. It needs to consider the size, potential and growth prospects of the market. The market research and strategy should consider the age, gender and consumer behaviour of target market? Proper assessments of the consumer purchasing power need to be conducted. The market share and competitors condition need to be assessed.

Sources of income and business process costs: Questions such as *who* is going to use this service or product? *How* are they going to use the services or products? Are consumers going to be paying for the services or there are other players on the scene? Can we offer features that can facilitate transactions and respect individual confidentiality? It is also crucial to fully appreciate the cost implications of production, logistics, delivery and any other business process related activities. The model should clearly accommodate mechanisms to compare revenue with service or product processing costs to identify trade-offs.

Rate on Return (ROR): The relationship between the monetary values invested to the amount obtained in business process illustrates ROR. The business modeller

should have a clear vision of short-term (opportunistic), medium-term and long-term investments (strategic).

Business-to-consumer and business-to-business practices: Customers in business models may be individual or group of consumers or other businesses. The advantages of B-to-C customisation concepts influence the B-to-B relationships. This is due to the fact that in order to maintain maximum customer satisfaction alliances should be made with other business partners to improve total capability of systems. Advanced technology, new business concepts, business oriented policies and regulations all need to be utilised to facilitate transaction of money and information through suitable and secure channels. The model should be capable of:

- Engagement in value networks by:
 - Configuring multiple strategic alliances to meet demands.
 - Enhancing customer value by minimising cost and reduced delivery time.
 - Optimising network through a comprehensive data management system
- Flexibility to interact in dynamic markets: Changes in prices and business practices in today's global markets influence purchasing, selling and contractual relationships.
- Information Aggregation: Data collection and management creates valuable sources of information. Revenue may be generated through direct or indirect acquisition of revenue from digital information.
- Convergence of B-to-B and B-to-C electronic Commerce.

Competition: A proper evaluation needs to be conducted on competitors' presence in the market; their strengths and weaknesses need to be assessed. Embedded mechanisms to compare systems capabilities will help electronic business systems developers make decisions on weaknesses of the systems and if necessary provide means of reinforcements (IEEE paper on capability).

Customer perceptions: Customer is the source of revenue and customer satisfaction should be the ultimate goal for any enterprise. Loyal customers are the best advertising force. Customer acquisition requires effort. The effort required for keeping customers is enormous. Companies sometimes fall into the trap of price wars to acquire new customers. Reducing the

profit margins normally is the first measure to consider in these cases. The danger here is that companies may consider reducing business process costs by savings in complimentary services. Such actions may sometimes effect customer satisfaction and consequently loss of business.

Continuous Improvement Programme (CIP):

CIP deals with establishment of embedded rules and techniques for continuous improvement. It focuses on two major issues product and process. Measures and mechanisms are developed for continuous customer input in service or product design. Also simultaneously, continuous process optimisation and improvements in efficiency and productivity will ensure sustainability.

Being electronically enabled most of the Business reengineering activities are conducted automatically and online.

6. BUSINESS MODEL LIFE CYCLE

To provide a blueprint for e-business life cycle a multi-stage process needs to be carried out. We divide these stages under two major functions: **Non-Cyclic** and **Cyclic**.

6.1 Non-Cyclic functions

There are three stages under non-cyclic functions, *Create*, *Lay Groundwork* and *Launch*. At the first stage "Create", ask yourself these questions:

1. Is the business going to compete with already existing business systems?
2. Is the service or product provided novel and unique or is it similar to what already exists?
3. What is the consumers' perception of the service or product provided?
4. How long do you plan to stay in business?

Once you are convinced that you can reasonably answer the questions, you "*create*". "*Lay Groundwork*" will be the next stage. This encompasses logistical and financial requirements for laying the foundation of the business. It also deals with identification of the major (strategic)

business associates. The third stage will be *“launch”*. At this stage the business will announce its physical presence with respect to national and international regulations. By physical presence we mean registration of the company with authorities and presence on the WWW. The reason we call these three stages non-cyclic is that they are not repeated for the same business model.

6.2 Cyclic functions

The cycle functions are continuous activities that need to be implemented and repeated if necessary. The *“Maintain”* stage, manages day-to-day business activities. It consolidates the customer relationships. It enhances relationships and interactions with business associates (short-term or strategic). In order to consolidate customer relationship and maintain partnerships the electronic business system needs to be innovative, *“innovate”*. It needs continuous improvements not only in product design but also in process optimisation. The innovation should include business administration and technological improvements. The business model should be able to comprehend the dynamics of its environment. It should therefore embed within itself mechanisms for *“sustainability”*. Since the business model deals with a viable system it should accommodate the capabilities required to *“sustain”*. The capability to *“remain”* in business requires flexibility to adjust to changes. These changes may be cultural, technological, or political. A general pragmatism towards business life cycle can help decision makers to take actions in crisis. It comes a time where decision should be made on whether to *“reinvent”* and remain in the business or avoid further losses by pulling the plug, *“end”*. Reinventing business requires an open mind and possible painful decisions. Many of the traditional practices need to be revised. Customer requirements need to be updated by in depth market research. Further investments are required to improve the levels of employees’ knowledge, skills and satisfaction. An overhaul of electronic system capability needs to be made by proper identification of resources such as workforce, equipment, collaborations, information, and management. Due to their nature electronic business systems possess fewer physical assets to recover business losses. The main assets of a company are knowledge and skills. A proper utilisation of sources of skills and enhancement to them is crucial to the reinvention stage. Figure 6 illustrates a schematic overview of business model life cycle.

```

graph TD
    Create[Create] --> LayGroundwork[Lay Groundwork]
    LayGroundwork --> Launch[Launch]
    Launch --> Maintain[Maintain]
    Maintain --> Reinvent[Reinvent]
    Reinvent --> End[End]
    End --> Create
    Maintain --> Innovate[Innovate]
    Innovate --> Sustain[Sustain]
    Sustain --> Remain[Remain]
    Remain --> Reinvent
    Reinvent -.-> LayGroundwork
    Reinvent -.-> End
    Reinvent -.-> Remain
  
```

7. FIXED POSITION VS MOBILE ACCESS

Internet technology and the World Wide Web have created a platform for dissemination and shared information. The revolution in personal computers has provided direct access to the WWW from office and home computers. This is the so-called *fix position* or wired access. A fixed position access requires a personal computer with the required software and interface using standard communication mediums to be hardwired to the WWW. This in itself imposes limitations to access. An indoor facility with all mods and cons need to be provided. The natural evolution to overcome the limitation posed by fixed position access is *mobile* access. Mobile access removes the place constraints imposed by fixed position accesses.

Telecommunication companies and mobile systems service providers have realised the potential of access to the WWW via mobile devices. With this in mind, heavy investments were made to provide the technology and interfaces required for mobile devices to connect to the Internet. Here we will mainly discuss the economics and business opportunities provided by both the WWW and mobile technology.

The fact that Mobile Commerce is the natural follow on from Electronic Commerce helps us describe the business models in the same context. However, there may be specific models that can either only be applied to traditional electronic or only to mobile commerce. The reason for this is that there are limitations associated with hand-held devices. These limitations include mobile device screen size, computing capacity and power.

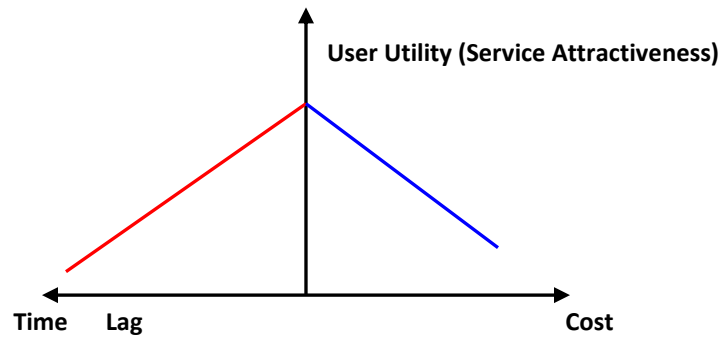
In addition to fixed Internet access, companies are also providing similar services for mobile device users. Although there seems to be huge similarities between these two types of

access to the WWW, there are some fundamental differences between these two in business practices and information presentation. Henceforth special attention needs to be rendered in designing fixed-position or mobile business models. Cost of connection using fixed-position Internet access has decreased rapidly and the trend is still downwards. Mobile connections to the WWW still deem to be costly. It is therefore necessary for service providers to pay special attention to users' requirements and preferences. The service or information provided through mobile sites needs to be downloaded quickly with the possibility of offline work.

There may also be a premium for real-time access to time sensitive information e.g. bidding for an artefact or booking tickets for a special game.

Figure 3.7 illustrates a possible relationship between time sensitive information, connection costs and user utility (service attractiveness) towards the service.

Figure 3.7: Relationship between service attractiveness with information cost and time lag



Where ΔT is the difference between the time an event takes place (T_E) and the time that the information is received (T_R) by the user:

$$\Delta T = T_E - T_R$$

The closer the service gets to real-time ($\Delta T = 0$) the more attractive the service becomes. Also with increase in service costs the attractiveness of the service suffers. Finding a compromised point where costs and timeliness offers best solution should be sought. Finding the point of compromise may help in offering high quality and timely service with an acceptable cost.

8. ELECTRONIC AND MOBILE BUSINESS MODELS

Here we will discuss some of the current business models developed from the evolution of electronic and mobile commerce.

8.1 Electronic and Mobile Shopping

Many traditional brick and mortar retailers have realised the advantages of presence in the WWW. It offers them a new platform for promoting their products. The Internet allows the shoppers to interact with the shops of their choice at their convenience. Shoppers use the connection to the WWW to browse through products of interest without the hassles of high street shopping. They do not need to drive through traffic jams or look for parking spaces! Many online shoppers have also realised that purchasing online also saves them their hard earned money. Electronically enabled shopping process has reduced overhead costs for companies and some of these savings are mirrored in cheaper prices for online products. Such offers are especially advertised as “web exclusives” and example can be viewed at currys.co.uk.

Some argue that Internet shopping does not have the thrill that high street shopping offers. The advancement in multimedia technology and programming has to some extent tried to address this issue by providing animation and sound. It has tried to put the touch factor by providing colourful images, easy to read and browse information with product comparison. To complete the shopping experience ordering, payment and delivery facilities are embedded in electronic shopping. With a click of a button the order can be placed. To finalise the transaction the shop provides a secure channel for electronic payment. Product is delivered through pre-defined channels. Electronic shops also offer the customers the opportunity to use traditional commercial channels such as: (1) telephone: to directly speak with a sales representative, (2) fax: to make queries or transfer credit card numbers and (3) face-to-face contact by giving the nearest shop address to the shopper.

Mobile technology and computing has added remote and instant accessibility. Shoppers who shop using their mobile devices look for special features such as:

1. Does this mode of shopping have any advantage to other modes?

2. Are there any specific incentives if the order is put through mobile devices?
3. Will there be sufficient information on the product via mobile services?
4. Does the mobile service provide better purchasing options such as product alternatives and real-time updates [5]?

As a designer of a mobile and electronic shop model a number of elements need to be well defined as features of e-shopping experience:

- **Product Browsing:** You should never forget the power of window-shopping! Successful high street shops recruit designers and architects to make their windows as inviting and representative of their products as possible. The website designed to promote should do the same. It should be informative, inviting, easy to navigate, and pleasing to see (proper colour schemes). It should provide sufficient information about wide-range of products. The information should not be too detailed or too brief (content). It should be modularised so that minimal navigation (going up and down or right to left) is required. Proper use of multimedia is highly recommended but be careful not to make the pages too long to download. On the mobile front one needs to consider the limitations and provide intelligent and compact solutions for product browsing. In the case of mobile shopping, products are more specialised and customers are targeted.
- **Product comparing:** Shoppers love to compare products. They need to be ensured that they have made the proper choice before committing to payment. It is crucial to provide shoppers with the facilities to browse different models, makes and versions of the product. It will be a prudent practice to even compare it with similar products from other shops. This is exactly what happens with traditional shopping. Do not forget most people will try different shops before they buy. So what makes your product stand out – give that to your online shopper and you will win their loyalty.

- Ordering and payment facilities: The model should consider a secure mode of ordering and payment. Any breach of confidentiality and abuse of personal information may seriously jeopardise online commerce. A simple ordering form with automatic updating features need to reside on the website or the mobile site. On the mobile site you should consider ease of navigation using mobile devices.
- Product delivery: The mobile and electronic business model should consider product delivery. In case of transfer of electronic products such as information, images, financial credit, stock exchange etc. the product can be delivered through electronic mediums. However, in instances where the physical products need to be delivered embedded rules and action plans are provided to facilitate the transport of the product. This is either done by in-house capabilities or outsourced to other companies.

EasyJet.com one of Europe's most successful airlines provides online ticket purchase and bookings. It offers services in seven European languages. This online service provides booking facilities (a), regulation advice (b), payment (c), customer profiling (d), and latest news on travelling issues (e) for their brand Easy Jet. Their WWW presence also provides a platform for other travelling services such holiday bookings, car rentals, travel insurance etc. (f) where we will discuss later in mobile and electronic procurement business model.

Figure 3.8: EasyJet.com an electronic shop

The image shows a screenshot of the EasyJet.com website with several annotations labeled a through f. The website layout includes a top navigation bar with links like 'book online', 'news', 'flight information', etc. The main content area is divided into sections: 'book online' on the left, promotional banners in the center, and 'latest news' and 'Internet links' on the right. Annotations point to specific elements: 'a' points to the 'book online' section; 'b' points to the 'We lower fares!' banner; 'c' points to the 'book online' link in the top navigation bar; 'd' points to the 'Hitting the slopes?' banner; 'e' points to the 'latest news' section; and 'f' points to the 'Internet links' section.

book online step 12345

To check availability and fares, simply tell us where you want to fly and when.

from

Aberdeen (ABZ)
Alicante (ALC)
Amsterdam (AMS)
Athens (ATH)

to

Aberdeen (ABZ)
Alicante (ALC)
Amsterdam (AMS)
Athens (ATH)

flying out on

16 February 2004

returning on

no, just one way

passengers

0 adults
0 children (2-12 years inclusive)
0 infants (under 2 years)

show prices

We lower fares!

From London to:

Milan £6.99
Nice £6.99
Toulouse £2.99

Click for details... (Taxes & charges excluded)

Hitting the slopes?

Push off with our downhill prices!

...click for details

quick answers

Enter keywords e.g. "baggage allowance"

go

route information

We fly 143 routes between 43 key European airports across the UK, France, Spain, Switzerland, the Netherlands, Denmark, Italy, Czech Republic, Greece, Germany, and Portugal. [destinations](#) | [timetables](#)

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important information

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Due to strike action by air traffic control staff at Paris Orly, easyJet regrets that the following flights in and out of the airport have been cancelled on Monday 16 February: ... [this story and more](#)

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84% of all flights arrived on time

97% of all flights arrived within one hour

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the web's favourite airline

Currys is a successful home electronics and home appliance retailer. They offer a wide range of products and have outlet superstores around the UK. They also provide their customers an online service where shoppers can enjoy all the necessary features of a powerful electronic shop. Product browsing with images and technical details, product comparison, secure payment, and customer services are some of the key features of such mobile and electronic business models.

Figure 3.9: Currys.com an electronic shop with powerful e-shop features

Currys HOME | STORE LOCATOR | JARGON BUSTER | CUSTOMER SERVICES | SITE HELP
Always Cutting Prices I'm searching for Register | View Basket

BROWSE PRODUCTS
Major Kitchen Appliances
Cooking
Vacuum Cleaners
Small Appliances
HiFi & Audio
CDs & DVDs
Phones & Faxes
Vision
Photographic
Computing
Gaming
Web Exclusives

Free £15 Gift Voucher
when you spend £150 or more - click here

AS SEEN ON TV
save £150
£449
click here for details

TOP DEAL
JVC TV & DVD Package
TV with PureFlat screen and Hi-Fi Stereo sound.
16cm Visible Screen Size and DVD player with zoom 3D phonic sound. Fanfest, Child Lock and Sleep Timer. Auto Install and 2 SMART upgrade. Matching Stand.
Currys Price £428.88

WEB EXCLUSIVE
Philips 18" Flat Panel LED TV
£1,195.00
Packard Bell Refurbished Freestyle Digital TV Receiver
£45.00
Sony 28" Digital TV, Video & DVD Package
£118.88
Kenwood Stainless Steel Dual Fuel Range Cooker
£998.95

CURRENT PROMOTIONS
Top 20 DVDs from £7.99
Click Here

Comparison Table
Make Your Ideal Choice....
Use our Jargon Buster for an explanation of key features.

	Full information	Full information	Full information	Full information	Full information
Brand	PHILIPS	CREATIVE LABS	SAMSUNG	PHILIPS	CREATIVES
Model	SRV005	MPV01 256 mb	MPV70	MPV100	MPV170A
Price	£199.99	£149.99	£179.97	£229.05	£279.99
Voice recording	No	Yes	Not Specified	Yes	No
Remote	Yes	No	Not Specified	Yes	Not Specified
Connection	USB	Not Specified	Not Specified	USB	USB2
Memory capacity	120 mb	256 mb	256 mb	3200 mb	Not Specified
Up to Playback Time	14 hours	31 hours	4 hours	30 hours	Not Specified
LCD Display	No	Yes	Yes	Yes	Yes
Software CD included	Yes	Yes	Yes	Yes	Yes
No of Included Cards	0	0	0	0	Not Specified
Capacity (Per Included Card)	0 mb	Not Specified	Not Specified	0 mb	Not Specified
Shuffle/program/repeat	Not Specified	Not Specified	Not Specified	Shuffle/program/repeat	Not Specified
Headphones Included	Yes	Yes	Yes	Yes	No
Rechargeable batteries	Yes	No	Not Specified	Yes	No
Add items to table	<input type="button" value="Remove item"/>	<input type="button" value="Remove item"/>	<input type="button" value="Remove item"/>	<input type="button" value="Remove item"/>	<input type="button" value="Remove item"/>
Clear table					

If you want to change the products in your comparison table, remove the unwanted ones first before adding more. If you put more than 5 items in your comparison table, the first item will be replaced.

As a mobile and electronic business modeller you need to make sure the category your product goes under. For example one may buy a ticket for a concert with his or her mobile device but it would be a different story if they want to select an automobile using mobile devices.

The Royal Festival Hall in London sells tickets for events that take place at its venue. The online ticket sales provide brief information about various events, artists, ticket prices and seating arrangements. Figure 3:10 shows the online ticket purchasing.

Figure 3.10: Online ticket sales example Royal Festival Hall Website and seating arrangements

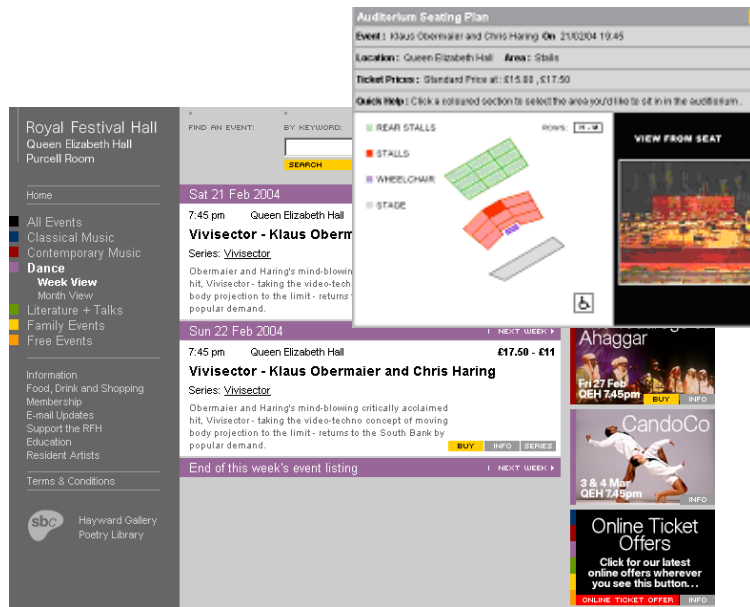
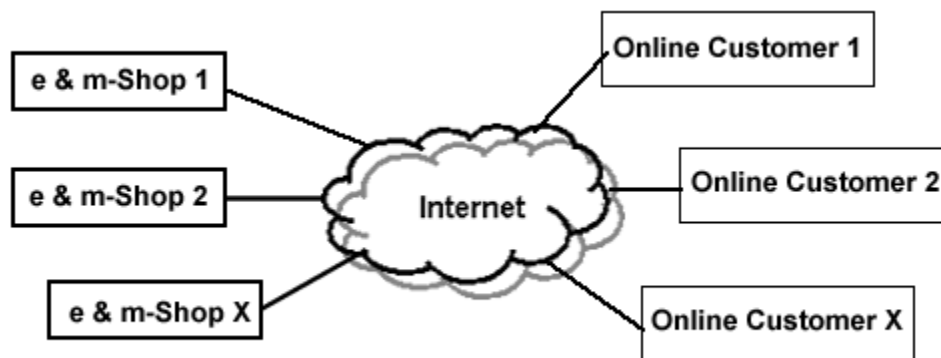


Figure 3.11: A schematic view of electronic shopping



Mobile communication technology has further expanded the reach to potential customers. There are limitations to fully utilise mobile sales due to the nature of mobile payments where younger people may not qualify for online transactions. However, the limitations on marketing are much less. For example Virgin mobiles carry a significant amount of marketing and advertising for their mobile phone subscribers (virgin.com).

8.2 Electronic Malls

In addition to the features described for electronic shops, electronic Malls are marketspaces (Westland 2000) where a collection of electronic shops or their products and services are gathered under a common umbrella. The key features that are associated with this type of business model are:

- **Branding:** In order to provide a strong presence and provide consumers with high quality services and products electronic malls emphasise on branding as a driving force for customer loyalty.
- **Cost reduction:** Electronic Malls or electronic marketspaces pull together a pool of buyers and sellers. It helps reduce processing, ordering and transaction costs to 1/3 of original cost. With reduction in business process costs the price for service and products can be reduced providing a better deal for customers.
- **Competition with traditional malls:** By providing a high quality low cost service branded electronic malls are competing with traditional brick and mortar malls.
- **Instant commercial interaction:** Once the digital relationship is established instant commercial interaction becomes possible.
- **Exposure to a wider market vs. inter-market competition:** Electronic Malls provide a wider choice of product and services that originate from different providers. The products are all exposed with equal opportunity to compete as part of a selection process rather than inter-market competition.
- **Providing shopping consultancy:** Customers will enjoy product reviews, advice and information that may help them make the right choice.

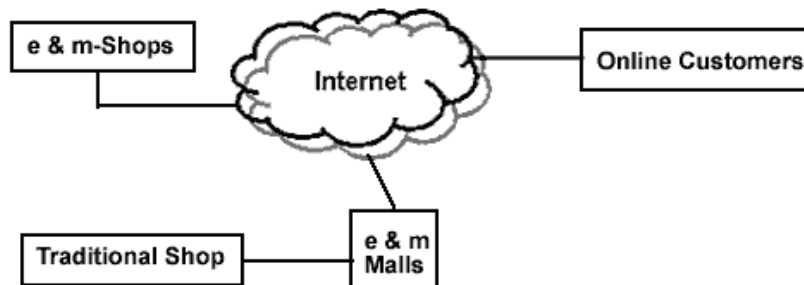
Access Market Square (icw.com) online mall offers a wide range of choice for various products and services. It provides a platform for customers to connect to specific brands with corresponding information. Shoppers are able to view different electronic shops and select their desired products.

Figure 3.12: Access Market Square electronic Mall



Other examples for electronic Malls are, ecat.com, 1virtualplace.com, Utahsnow.com, and mallforall.com.

Figure 3:13: A schematic view of shopping experience with electronic Malls



8.3 Electronic and Mobile Auctions

Electronic and mobile auctioning similar to traditional auctioning provides online and real-time bidding mechanisms. Bidders use their fixed-position or mobile devices to partake in exchange of money and products. As designer of an electronic and mobile auction system, one should be aware of the importance of instant access. Especially with mobile devices communicating with an enthusiast at anytime anywhere is crucial for successful business. Simple uploadable and downloadable sites with secure payment will help in creating a community. The main features of electronic and mobile auction business model are:

- Provision of attractive products: Auctions are mainly for enthusiasts and collectors with high level of expertise in the area. It is therefore important to provide accurate information.
- Community building: Providing specialised products and services encourages customers and communities to exchange material through a trusted platform. The build-up of the so-called regulars on an online bidding system is where the revenue is generated.
- Bidding facilities: An acceptable interactive interface with all the necessary bidding features is the most important factor for a successful online auction.
- Validation and Verification: Once biddings take place control procedures are put in place to monitor bidding processes. Unlawful acts and unreasonable activities can be detected where sellers and buyers are alerted.
- Security: Just as any transaction over the WWW personal information and financial details should only be accessed by authenticated individuals.

eBay (ebay.com) provides the world largest personal online bidding and trading community. It has built an online person-to-person trading on the WWW. Buyers and sellers are brought together in a manner where sellers are permitted to list items for sale, buyers to bid on the item and a browsing feature that allows buyers to view the information. The items are arranged by topic, where each type of auction has its own category. An interactive website streamlines

traditional person-to-person trading which has traditionally been conducted through auctions, garage sales, collectibles, and flea markets. This facilitates easy exploration for buyers and enables sellers to immediately list an item for sale within minutes of registering. Bidding is for free at eBay. The sources of revenue at eBay are: (1) the “insertion fee” here sellers are charged for listing their commodity, (2) “additional listing options” where the product gets a promotional feature such as flashing or bold printing on the website and (3) a commission charged over transaction which is normally a percentage (1.25% - 5%) of sold value.

Figure 3.14: eBay online auction



home | pay | register | sign in | services | site map | help

Browse Search Sell My eBay Community Powered By IBM

Welcome to eBay

Buying new items, brand names, and collectibles on eBay is simple. Here's how it works...

Live help

1 Find Search or browse for an item

What are you looking for? Search

Search Tips How to Search

Browse for an item

Select a category... Go

Specialty sites: eBay Motors | eBay Stores

You must register to bid or buy. It's fast, easy, and free!

Register Now How to Register

Registration Benefits:

- Personalized shopping page
- Your favorite saved searches
- Most-wanted-item notifications
- Access to last-minute bargains
- PayPal Buyer Protection

Already Registered? Sign In

Global Sites

Select a country... Go

2 Buy Use "Buy It Now" or place a bid

Buy It Now

You won't have to wait for the auction to end -- purchase your item instantly.

Place a bid

Enter the maximum amount you want to spend; eBay bids for you, up to the limit set by you.

Review Feedback

Feedback ratings are based on a user's past transactions and help you learn about the seller you're dealing with.

How to Bid and Buy

3 Pay Once you've won, pay the seller

Pay for your item

You'll receive an email from eBay explaining how to pay the seller.

Most sellers accept PayPal. It's a safe, fast, easy and free way to pay for items and you'll be protected up to \$500 on qualified listings through PayPal Buyer Protection.

Many sellers also accept payment by check or money order.

Get your item

After the seller receives your payment, the item is sent to you. It's that easy!

How to Buy with Confidence

Featured Items all featured items...

- LOSE 88 LBS BY APR GUARANTEED? NEW DIET PILL
- CAREER AS WINDSCREEN FITTER IN ESSEX/SUFFOLK
- 40 ac Arizona Ranch Land WITH WELL!! \$368/mo*
- AMAZING #1 FAT BURNER DIET PILL!! LOSE 91 LBS?
- Lot of 30 Xbox Video Game Systems + 30 Free Games!!
- LOSE 90 LBS BY APR GUARANTEED? NEW DIET PILL

Registering at eBay site

Registration: Enter Information

1 Enter Information 2 Agree to Terms 3 Confirm Your Email

First name Last name

John Smith

Street address

Kington Lane

Town / City

Leeds

County Postal code Country

West Yorkshire LS10 3PH United Kingdom

Primary telephone Secondary telephone

(0115) (274 000) () ()

Important: To complete registration, enter a valid email address that you can check immediately.

Email address

John.Smith@hoymail.com

Re-enter email address

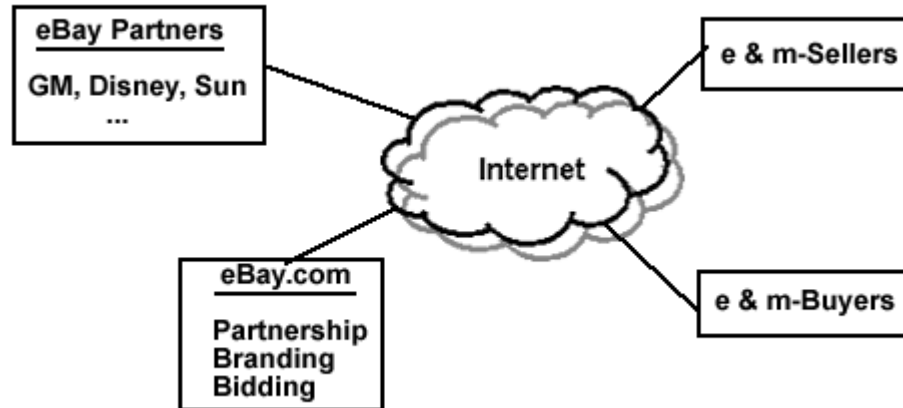
John.Smith@hoymail.com

Create your eBay User ID

JSmith

Create password

Figure 3.15: A schematic overview of mobile and electronic auction



8.4 Electronic and mobile value chain integrators (VCI)

The legacy of electronic commerce is to cut the most detested non-value adding middleman. The electronic procurement services (intermediaries) need to conduct value- adding activities to justify their presence. VCIs such as online travel agencies design package holidays, provide special offers, accommodation, and recreational services by negotiating prices with service providers (lastminute.com). This saves their customers, time and money in finding the most cost efficient and desirable holidays or business trips. Other examples are online estate agencies (chaseevans.co.uk), automobile retailers (cars.shop-4.it) and value chain integrators (amazon.com).

The product-market strategy pursued by online VCI systems is based one:

- Focussing on current sales opportunities with emphasis on cost reduction. The objective here is to establish a market presence among the leading players.
- Using Internet technology for improved product or service presentations. It offers innovative marketing services such as multimedia, additional customer services, insurance, and financial arrangements.

The sources of revenue for this type of business model can be charges on added value

activities, commissions from product suppliers and possibly customer subscription fees for specialised services.

The specific features associated with online value chain integrators business systems may be listed as:

- **Product customisation:** Good appreciation of market and technology trends with embedded techniques to acquire market information and analysis of information. Continuous observation and monitor of competitors' achievements is necessary to maintain advantage. Embedded mechanisms for sales feedback to observe growth or decline in business need to be envisaged. It is vital for the business to possess interactive online features to continuously assess customer satisfaction towards product or service. This will ensure high quality services and products with respect to customer requirements.
- **Wide choice of supplier:** With the incorporation of large number of virtual and physical businesses, it provides the platform for creation of consortium of suppliers. This helps in branding, promoting and improvements in business process. Installation of embedded rules for outsourcing and in-house provision of services with the aim of maximising capability to provide high quality services and products to customers.
- **Low purchasing cost:** Since the business model is designed to provide a range of products or services under a specific package it gives the electronic and mobile procurer assurance that product or service quality is not compromised.
- **Utilisation of Electronic Process (Keen et al):** Strong inter-organisational and extra-organisational relationship between players. Electronic and mobile VCI systems primarily emphasise on **prioritising, coordinating** and sourcing using a combination of: (1) software applications to convert business activities to electronic format, thus facilitating **automation of processes**, (2) creation of electronic links to business partners, (3) project management and resource allocation with aim to manage people, workflow and routines that constitute business functions, and (4) exception

and error handling, the capability to address technical and organisational shortcomings with minimal damage to reputation and business practices.

- Provide a platform for shorter lead-time with the emphasis on convenience for retailers, suppliers and customers. This is achieved by specialisation in specific functions such as payment, logistics, finance, legal advice, and market services. The system consists of highly qualified experts in an open intranet network.

Figure 3.16: Lastminute.com example of an online travel agency providing a range of services by putting together a set of services using group of business partners.

The screenshot displays the Lastminute.com homepage. At the top, there's a navigation bar with links like 'Shopping Basket', 'Your Details', 'Sign In', and 'Help'. Below this, a 'Quick Search' section allows users to search for products. The main content area is divided into several sections:

- Holidays:** Features a 'Can't wait 'till summer?' banner and a grid of holiday packages including 'Winter Sun', 'Short breaks', 'Last Minute', 'Family & Friends', 'Cruises', 'Holidays', 'Flights', 'Hotels', 'Trains', 'Cars', 'Hire', 'Flights + Hotel', 'Holidays', 'Flights', 'Hotels', 'Trains', 'Cars', 'Hire', 'Flights + Hotel', 'Holidays', 'Flights', 'Hotels', 'Trains', 'Cars', 'Hire', 'Flights + Hotel'.
- Flights:** Includes a 'Flight + Hotel Search' section with a search form for departure and return dates, times, and destinations.
- Hotels:** Features a 'Hotels' section with a search form for departure and return dates, times, and destinations.
- Lifestyle:** Includes a 'Lifestyle' section with a search form for departure and return dates, times, and destinations.
- Gifts:** Features a 'Gifts' section with a search form for departure and return dates, times, and destinations.
- More:** Includes a 'More' section with a search form for departure and return dates, times, and destinations.

At the bottom, there's a 'Sign up to our email newsletter' section and a 'Make a date' section for the London search calendar for February 2004. The 'Hotels bestsellers' and 'Theatre bestsellers' sections are also visible.

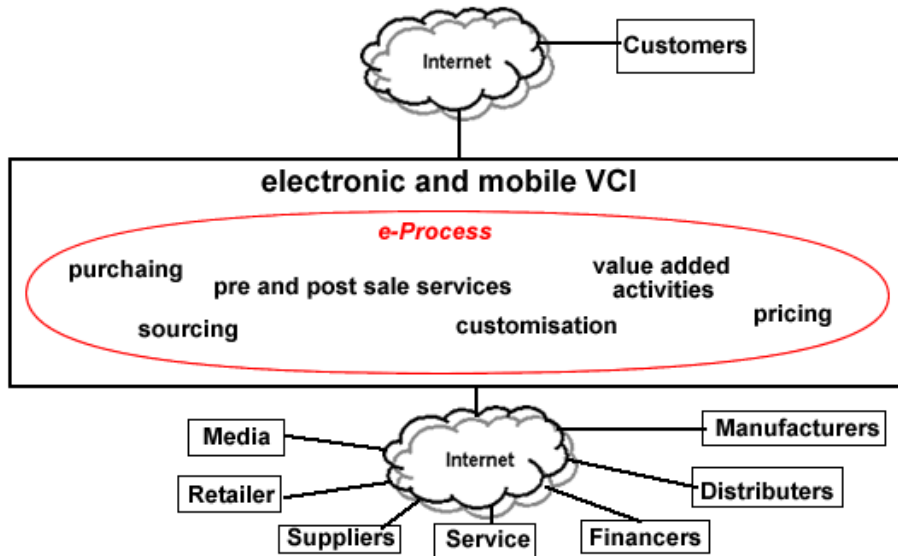


Figure 3.17: A schematic view of electronic and mobile Value Chain Integrators

Other examples of electronic and mobile value chain integrators are DoCoMo.com specialised in offering mobile services and amazon.com online product and service provider.

8.5 Electronic and mobile content provider

The business model proposed for electronic content provision mainly intends to supply detailed and critical information with regards to individuals, groups, communities, fans, products, services, politics, religion, and scientific forums. Online content providers may provide their research and opinions free of charge. They can consist of a simple electronic document or a sophisticated website with multiple links. Some examples for these models can be non-governmental organisations (NGO), research councils, health advisors, unions, sport and music fans, and many other non-profit entities. However, there are online content providers that may charge subscription fees, advertising billboards or commissions for hits on provided links. For example online employment agencies match jobseekers with employers for an agreed fee. Other examples of fee based content provision are web-based educational courses (Sun micro systems), where the course provider offers time limited access to material for a nominal fee.

The emergence of social network platforms such Second Life, MySpace, Twitter, LinkedIn, and Facebook which can be considered under the same business model has proved the viability of such models. The successes enjoyed by some of these companies will continue in the future

by further specialisation of social networks.

Some of the common features of online content provider systems are:

- Rich in content: Continuous improvement on content sharing and dissemination of information.
- Specialised: In cases online content providers offer their advisory and consultancy services with the aim to increase public awareness and contribute to knowledge and research. Third party marketplaces follow the same business model by taking web marketing and advertising responsibilities. These companies have a strong presence in the WWW activities and public relation practices (netobjects.com, fusepr.com). Community Research and Development Information Systems (cordis.lu), is EU's research forum website where information is supplied to academics and industrialists on current research and development projects and funding opportunities. Cancer Index (cancerindex.gov) is a site that links to cancer related research work and also a powerful search engines to find content based on key word search. howstuffworks.com, offers interesting information with regards to how things work by simple and comprehensible explanations. Charcolonline.co.uk is a user-friendly environment for comparing financial services i.e. mortgage, loans and insurances from various companies and ranks them in order of fitting the enquirer's needs. The profit making content providers offer their highly specialised services for a subscription fee, commissions of sales or profits. Online specialised journals are a good example for subscription fee based online content provision. tandf.co.uk is an example of online journals that is provided by Taylor and Francis publishing group for online customers for a fixed annual fee. In case of LinkedIn or Facebook, the content revolves around personal, family and social life of individuals that are shared amongst friends and family.
- Powerful search engines: Embedded software for searching the WWW or the specialised website or sites. Google.com is one the most powerful online search engines that find and supply content free of charge.

- Figure 3.18: Online journals provided by Taylor & Francis publishing group**

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Figure 3.19: Cordis.lu a non-profit making online content provider contributing to research and development in EU.

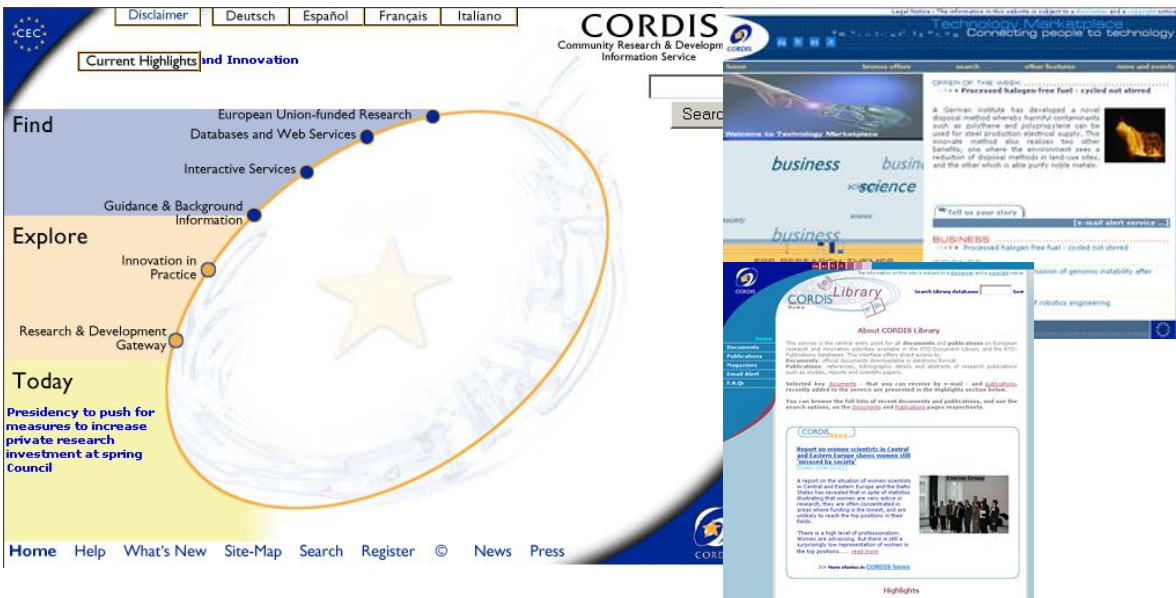
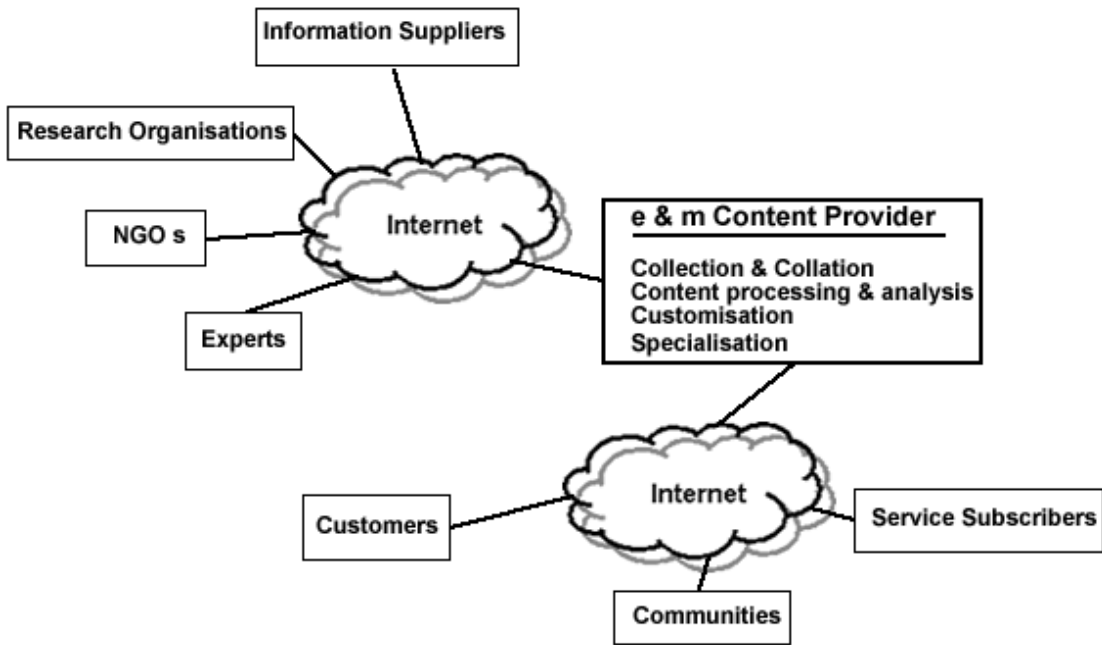


Figure 3.20 shows a schematic overview of online content provider business system.

Figure 3.20: Schematic overview of a typical online content provider business system



There are also content provision models that are specifically designed for mobile device users. In addition to browsing facilities mobile content providers offer two types of mobile text messaging for subscribers, mobile server messaging and PC based event trigger messaging. Mobile server messaging provides automatic SMS messaging to mobile phones. PC based event trigger is normally based on a specific algorithm prompting messaging for specific subscribers. For example mobile servers at universities can provide SMS to students alerting them on their lectures and lab programmes during the days of a week.

Normally content providers charge service users a subscription fee which could be based on connection charge, weekly, monthly, or annual fee for service provided. For example Vizzavi Netherlands offers real-time traffic update services on WAP portal to all its subscribers for a subscription fee. The traffic information is displayed through graphical maps representing motorways of 14 different regions and tourist destinations in the Netherlands or through short message services (SMS) alert messages to the subscriber's mobile device (vizzavi.net).

8.6 Electronic and mobile financial services

This online business model deals with customer oriented banking, investment and finance services. Customers expect to have access to financial service at anytime regardless of where they physically are. Traditional banks have realised the convenience online banking provides for their customers and have recently invested heavily to cater for all requirements. For example HSBC a bank with global presence provides its customers with local and international services online. Customers can now update their business or personal accounts, pay bills and use other financial services once they are connected to the WWW. The success has instigated the presentation of virtual financial systems that solely conduct business on the WWW. For example Egg.com is an online financial service provider offering a range of services from saving account, mortgage, loans, investment, to insurance. Also there are online investment consultants where investors can acquire information regarding shares on stock exchange markets around the

world.

The electronic process embedded in financial services enables traditional and electronic business systems to significantly cut overhead costs. This in return enables such systems to provide services that are less costly and more effective. A cost analysis conducted by Keen et al in 2000 reveals that, cost of banking using ATMs is 65p, call centres cost 18p and online banking costs 0.6p.

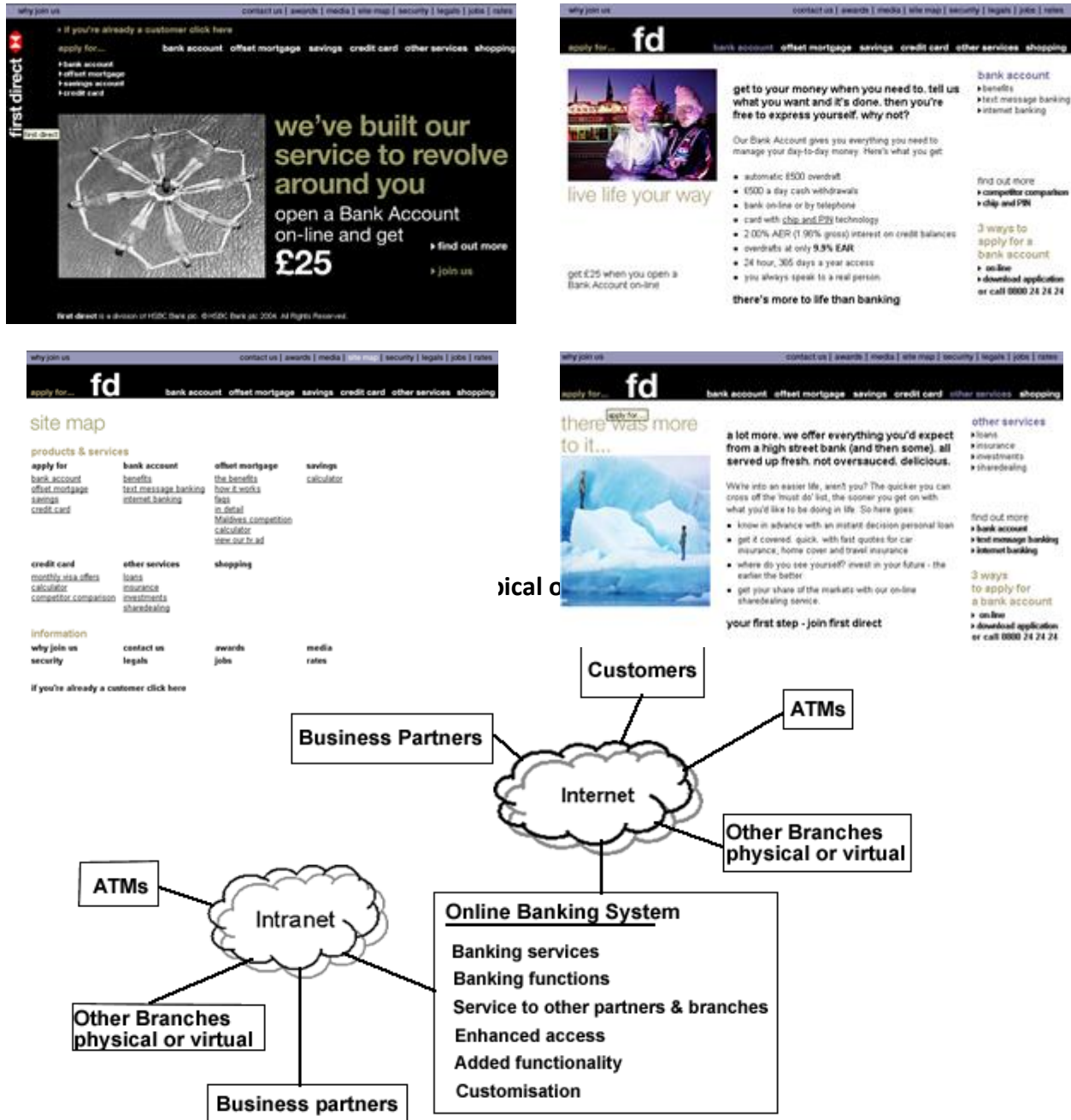
8.6.1 Online Banking

Some of the key features associated with online banking that may be shared with other online financial services are:

- Online secure banking services and functions: It encompasses all the necessary attributes of banking services such as electronic enabled transactions, balance enquiry, monetary transfer, bill payment services, and credit assessment. The electronic process facilitates automation of report printing, calculation of balances, interest calculation and many other repetitive internal activities that used to require operator intervention.
- Cross branch networking and integration: Electronic networks have enabled more traditional banks to integrate various branch activities. Electronic data exchange using secure channels has enabled banking systems to interact using the Internet. The embedded e-process gives these banks a significant advantage in real-time data utilisation and speedy transfer of funds from one location to another. It has given the edge in commercial activities where now global presence secures market activities and investments with a significantly shorter lead-time.
- Enhanced access, added functionality and customisation: Online banking provides robust customer-oriented services with respect to improvements in access regardless of time and distance. It offers a wide range of services with added value and increased levels of functionality based upon customer requirements. The methodical approach to ensuring maximum customer satisfaction adopted by online banks should improve quality of service thus enhancing customer

relationships.

Figure 3.21: firstdirect.com online banking from HSBC group



8.6.2 Online Investment

The additional edge that has made online financial systems attractive and ubiquitous is electronic investment and shareholding. From a customer's point of view the value chain for investment services include: investment strategy, investment decisions, finance planning, trade execution, portfolio servicing (Westland 2000), and performance measurement (Capability paper). Companies such as: Fidelity.com, Sharebuilder.com, Schwab.com, Foresight-Investment.com, Bloomberg.com, UBS.com, and Morgan Stanley are online investment service providers. Different brokerage firm types offer different types of services. A full-brokerage service participates in investment decisions and is more likely to offer a higher level of service at every stage of the process. Discount brokers, on the other hand, operate in a more specialised and focussed format. They primarily provide trade execution with limited support, customer service and performance measurement (Westland 2000).

The value chain and value added activities for brokerage firms are: marketing, research provision, capability analysis, investment advice, trade execution, account servicing, financial planning, and asset management.

Financial market systems seem to be very similar to auction systems in essence, however, financial markets are considered to be double auctions. Double auctions assume that there is a group of suppliers and a group of buyers where sellers publicly announce their prices so that the market price is adjusted based on supply and demand. Significant improvements have been made in electronic systems to monitor and control the market activities that we will briefly explain later in the section.

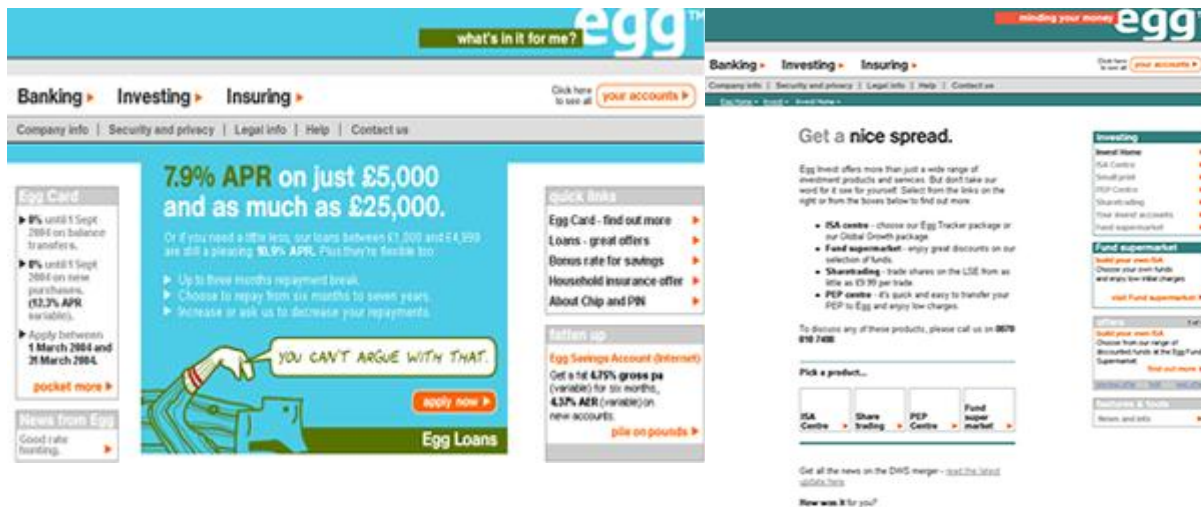
In addition to the features online investment systems share with electronic banking and auctions systems they also exhibit some specific characteristics. These characteristics include:

- *Fairness:* in fair-trading practice no organisation or individual should enjoy special treatment. All interested parties should have access to accurate and equally distributed information.
- *Efficiency and Transparency:* Information on value, supply and demand should be updated without delay and properly disseminated amongst interested parties. A

transparent system ensures the timeliness of the information.

- *Orderly*: Traders have considerable information regarding price turbulences. Sometimes changes in price can instigate fluctuations in security¹ prices. In order to control these markets have developed specific safeguard mechanisms. For example, “circuit breakers” automatically stop trading if the exchange detects an excessive drop in prices. The system also provides traders the best price by matching sellers price and buyers bid².

Figure 3.23: Egg.com a typical online financial service provider



8.6.3 Online Shareholding

Despite the role played by professional brokerage services, online stock trading encourages traders join the electronic shareholding to reduce traditional brokerage costs. The Exchange's Electronic Shareholding service was launched in 2001. The service offers private investors the

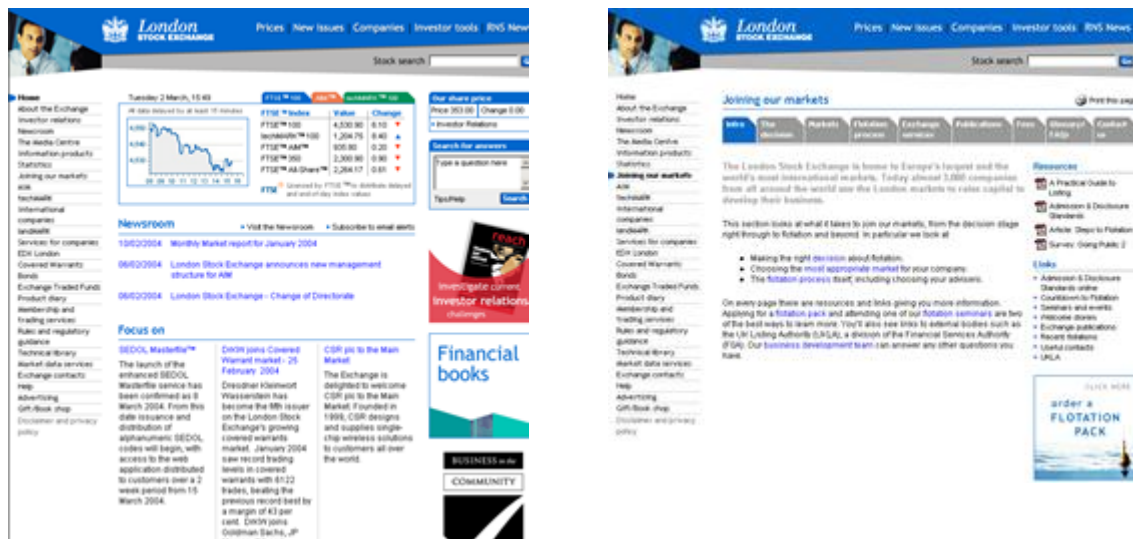
¹ Certificate of creditorship or property carrying a right to receive interest or dividend, such as shares or bonds. The financial asset represented by such certificate.

² For further information on electronic investment, activities prohibited and pricing criterion please refer to: Westland J.C. and Clark, T.H.H. (2000), Global Electronic Commerce: theory and case studies, MIT Press.

opportunity to hold shares in electronic form while retaining the full benefits of legal ownership. With direct access to market information investors are able to observe various security process and forecasts. The London Stock Exchange online services londonstockexchange.com is a good example.

Historically, buying and selling shares required a large amount of paper work. The introduction of an electronic share-holding service provides a paperless settlement system, thus reducing the costs and inconveniences caused by paper. One of the companies offering electronic security settlement services is CREST. CREST is the multi-currency electronic settlement system for UK and Irish securities. It offers firms and individual investors the opportunity of holding securities in secure un-certificated form and transferring them electronically in real-time with effective delivery against payment. The service can handle transactions in Pound Sterling, Euros and US Dollars, making it possible to trade securities in international markets.

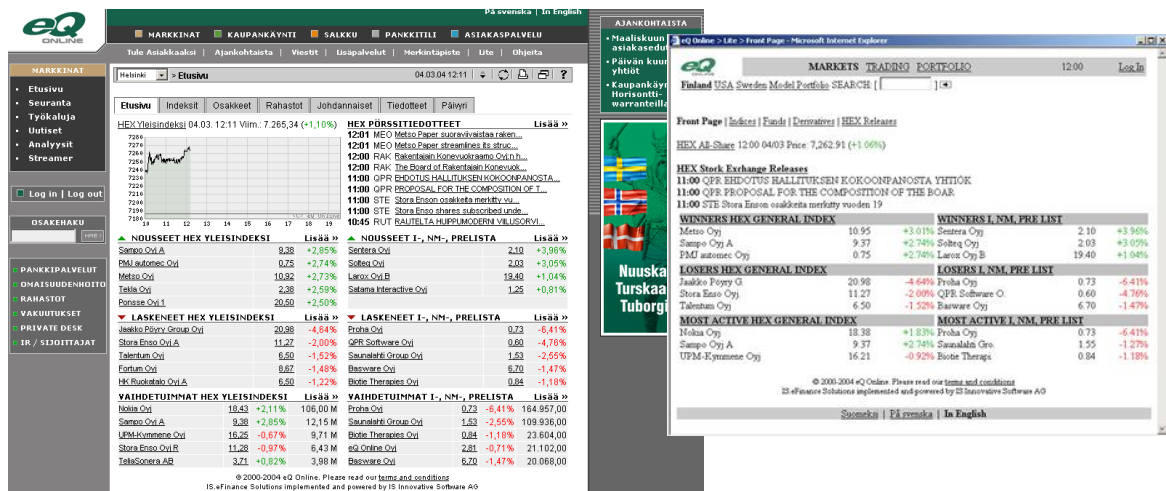
Figure 3.24: londonstockexchange.com offers valuable information for online shareholder



Mobile device users can get time sensitive information on market fluctuations by logging on

to financial services website and make decisions on the fly. This can have a major effect on the performance and trading success. eQ online (eqonline.fi) provides market indices, trading and portfolio services on both web browsers and PDAs such as Nokia Communicator for mobile customers. The service covers Finish, Swedish and US markets.

Figure 3.25: eQonline.fi mobile and electronic financial services



8.7 Electronic and mobile entertainment

Electronic music, games and multimedia have provided a great opportunity for enthusiasts to use online entertainment services. These services include transmission of online services e.g. radio's, betting, dating, music and games or downloadable files such as music and movies. Due to small memory capacity and power restriction of mobile devices mobile entertainment is more limited to downloadable files such as ring tones and mobile games. Normally games are based on type of mobile device the user owns. Also mobile devices equipped with local and personal area networks such as Bluetooth technology provide attractive mobile games where two or more users can play against each other.

Sources of revenue for electronic and mobile entertainment business systems can be subscription fees, fixed price for specific product, and commissions on betting services.

A major issue with online entertainment service provision is copyright and pirate versions of products which has immense effect on this type of business. File sharing is also another source of copyright violation that electronic and mobile music is suffering from. According to the

Recording Industry Association of America (RIAA) there is no accurate figure for the amount of loss associated with illegal usage of online music services. However, the music industry estimates that 10%³ drop in sales in year 2000 can be associated with illegal downloads and copying.

Figure 3.26: Schematic view of a typical online entertainment system

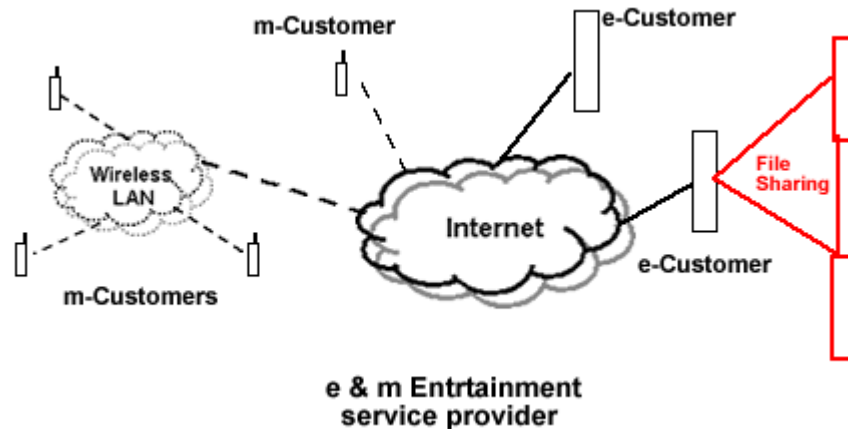


Figure 3.27: Online entertainment: entermp3music.com (music), ladbrokes.com (betting), themobilerepublic.com (mobile games), and bbc.co.uk (radio).



News research.

8.8 Online collaborative platform

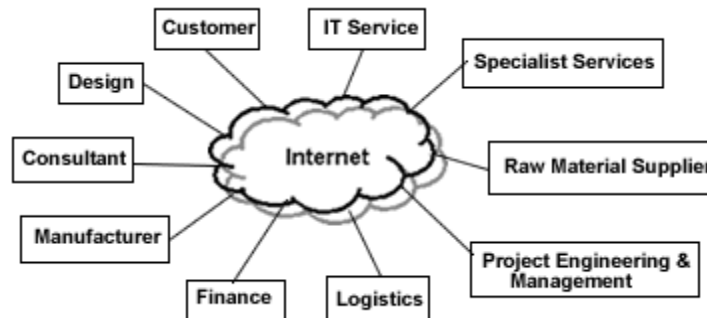
The rationale behind online collaboration platform business model is that companies form permanent (strategic alliance) or temporary (alliance of convenience) to plan, control and reduce procurement costs. In this virtual world of cooperation large consortiums are built to bid for projects, huge purchases and research grants. This is where size matters! By integrating their e-process companies they form a formidable power in identifying suppliers, customers and delivery entities within the supply chain. Each member of the consortium contributes to the formation of a functional mega system that encompasses the whole value chain activities. The main features of this online business system are:

- Customer orientation: Groups and partnerships are formed around customer requirements for maximum conformity.
- Collaborative purchasing: Large orders result in savings in purchasing costs. These savings can be in the form of bulk discounts for large purchases, less ordering and delivery costs.
- Collaborative engineering: A group of companies provide secure interlinks and each provides their expertise to fulfil projects. These collaborations include the process of idea generation, design, manufacture, project management, logistics, and consultancy services. Depending upon the nature of projects various members join forces to conduct specific tasks. For example Lufthansa Systems GmbH is a derivative of Star Alliance Airlines a consortium of 16 airlines offering travel services. Lufthansa Systems speciality is to utilise the facilities and travelling routes of the Star Alliance to offer optimal solutions in provision of travel and cargo services. The objective here is to maximise serviceability for customers by identifying the capabilities of each member of the alliance and reducing operational costs.

The e-process edge provided by interconnected and information sharing platform and usage of optimisation algorithms enables the system to offer solutions for the members of the alliance. It helps dealing with the complexity of putting together travel plans, logistical and engineering support for smooth operation. Figure 3.28 shows a schematic representation of a

typical online collaborative platform business model.

Figure 3.28: Schematic view of a possible online collaboration



8.9 Electronic manufacture

It is essential for any manufacturing system to generate, store, support, and disseminate information during the product life cycle. Production life cycle can be described as the time it takes from customer putting the order, design process, logistics, production process, testing and documentation, delivery, after-sale services, and regular updating of data. In the earlier days, a large amount of paper work was associated with individual products. Keeping the information in a safe place for further referencing and regular updating required a significant amount of time and effort by engineers and clerical staff.

The Electronic Data Interchange (EDI) revolutionised manufacturing tasks. With improvements in computing, storage and networking facilities managing and supporting manufacturing related information became cheaper and less laborious. Companies such as Cisco, SAP, Microsoft, Baan, Xerox, and many others developed generic software to integrate management, finance, scheduling, and logistics of manufacturing systems for improved service. Internet technology transformed the way manufacturing systems functioned. Connections between shopfloor communications all the way to e-enabled MRP and ERP systems have enabled manufacturing systems to be more agile and responsive.

8.9.1 PDM systems⁴

The notion of Product Data Management (PDM) systems relates to electronic enabled information that supports manufacturing activities during production life cycle. The system is based on a database where information regarding all the products is stored. The database allows easy navigation, searching, and data reuse. PDM technology provides a platform for exchange of data from design through to manufacturing support. Using Open Database Connectivity (ODBC) technology, PDMs can act as a medium connecting OEMs, sub-contractors, vendors, consultants, and customers by storing and managing data.

PDM systems provide a structure in which all types of product information can be controlled. This includes electronic documents, digital files, and database records relating to:

- Production configuration
- Project plans
- Design data
- Audio/Visual annotations
- Product specifications
- Scanned documents and images
- CAD drawings and models
- Maintenance and service records
- Electronically stored documents, notes, memos, and correspondence
- Safety and regulatory requirements
- Engineering analysis and results
- Production Process Flowcharts
- Production Schedules

⁴ I would like to acknowledge the contribution of Philip Read to this section of the book. Philip conducted a PDM feasibility and implementation project for DTC as his MSc. final year project.

- Machine part specifications
- Robots, CNC and NC programs
- Bill of Material (BOM)

In an industrial case compiled recently Diamond Trading Company (DTC) manufacturing commissioned a consultant to investigate the benefits of implementing PDM. The results and analysis are described in the following sections.

8.9.2 Product structures and relationships (PDM benefits)

PDM can enable the creation and management of product configurations and Bill of Material (BOM) and allow users to associate product definition data such as drawings, documents, and process plans to parts and product structures.

Currently the CAD software used by DTC (mechanical or electronic CAD models) produces ASCII files that list all the components and quantities used in the assembly that is in a CAD file. The CAD user then edits this file in a notepad to manually add non-geometric entities such as adhesives, lubricants, solder, etc. The file is then imported into the MRP system to create the BOM and product structure. In addition to manual editing of the file to add parts, the other drawback is that currently there is no mean for associating any information to BOM. Whilst DTC has many electronic documents that pertain to particular assemblies, there is no formal method of relating these to a particular BOM.

PDM will enable the interaction of CAD created files and BOM through its ODBC. For example PDM can represent data to BOMs in, *.rtf, *.txt, *.xls, *.pdf, *.bmp, and *.jpeg.

The association of these documents to the BOM offers benefits of data reuse, ease of access, accuracy and speed in data retrieval. Podium is commercialised PDM system (barlowwilson.com).

The new electronically enabled business models have assisted the evolution of manufacturing systems. The historical approach to manufacturing was that: “ We manufacture a product using raw material supplied by our trusted suppliers and our manufacturing capabilities and then sell the product off-the-shelf to a group of customers who we know and they know

us.” With the help of manufacturing techniques and philosophies such as: JIT, MRP, ERP, Agile, FMS, CE... e-Commerce has redefined the space of entrepreneurial manufacturing. Customer oriented design and manufacturing philosophy and embedded rules has enabled manufacturers to produce products suitable for individual customer or a target market. For example, Dell Computers provide an online platform for assemble and manufacture to order personal computers (PC). By utilising electronically enabled B-to-B and B-to-C process that take place on the Internet, Dell Computers has gained the largest market share in PC business compared to traditional manufacturers. The business process modellers of Dell realised the potentials of WWW in not only using the Internet for advertising and selling purpose but also as a platform for strategic alliance with other manufacturing companies. This is done by embedded e-process and information is automatically updated. Dell has created “Virtual Integration” with both its upstream (component suppliers) and downstream partners (customers) so that the entire supply chain acts like a single integrated company. In order to keep inventory and ordering cost to minimum the company forwards its requirements to suppliers once customer puts an order. The short order lead-time not only helps in keeping inventory low but also helps Dell install the latest parts on its PCs.

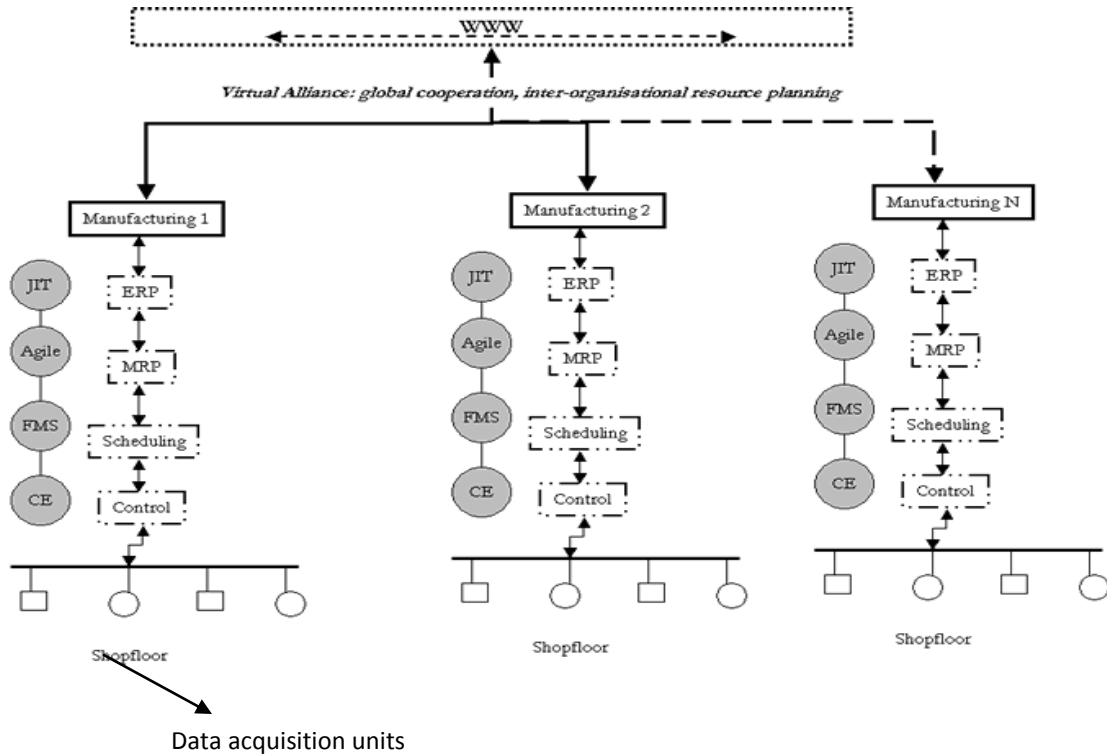
8.9.3 Global manufacturing systems

Virtual enterprise systems have brought a group of companies and technologies with common interests together to virtually merge on the WWW. These companies can co-research, co-develop, co-design, co-manufacture, and co-market products. WWW has changed the manufacturing systems historical models in controlling, scheduling and producing products in real-time. Companies can now communicate with each other with no time or distance limitations to exploit any given opportunity with the best possible manufacturing capability.

Figure 3.29 shows electronically enabled manufacturing systems. The most inner layer is the manufacturing control layer where SCADA systems ensure the flow of information to and from the shopfloor equipment. The scheduling layer uses the information from the shopfloor, production-planning unit and runs optimisation algorithms to find the best-fit schedule to meet production requirements. The MRP and ERP systems ensure that the required material and resources from engineering and management perspective are supplied. The virtual alliances with other manufacturing partners create a strong interface and interaction through the WWW

to reach customers all over the world. The JIT, Agile, FMS, CE,... techniques and philosophies ensure that the enterprises' functionality yield optimal results in the shortest possible time.

Figure 3.29: E-manufacturing a global system



SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. Explain and analyse the three approaches for system definition? In your opinion, how should system designers and analysts deal with modern m&e business system?
2. Explain the life cycle for a typical m&e business system. Use Amazon.com as an example to explain the various stages of the life cycle. At present, which stage do you think the company is in its life cycle. Compare with Asos.com.
3. Explain the relationship between service attractiveness against Time (information in real-time or delayed) and Cost.
4. Within the context of classic m&e businesses models explain in full the following

electronic and mobile models: Content Provision, Auction and Manufacture. In your explanation you should include the key features, sources of revenue, e-Processes, and product/service customisation, and value chain. Use a diagram to explain the value chain.

Chapter 4

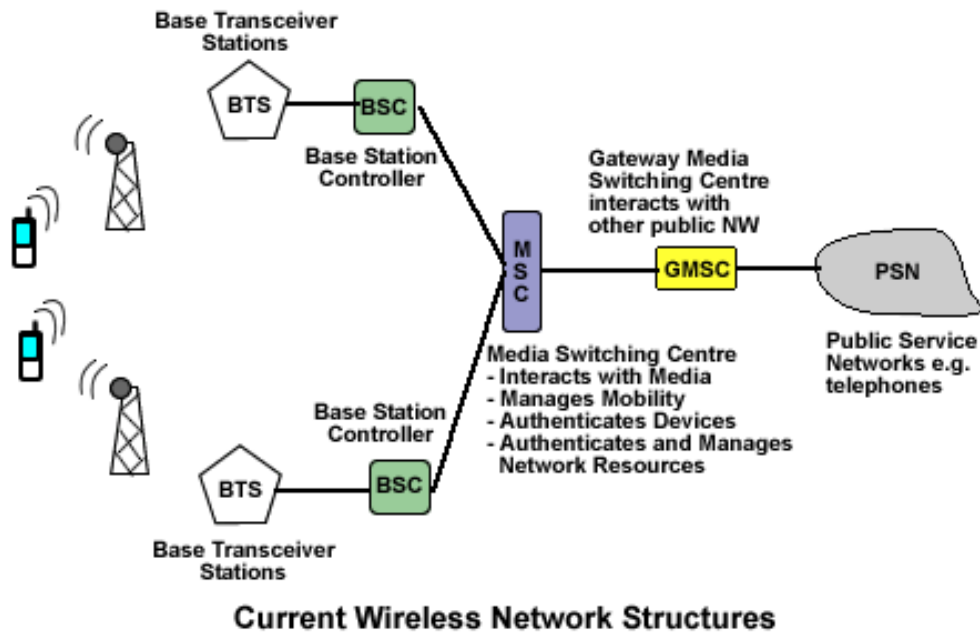
NETWORKING AND COMMUNICATIONS IN E-ENABLED SYSTEMS

TOOLS AND INFRASTRUCTURE

Business practices and the Internet came together and created the new revolution in commerce. Business per say does not necessarily work on the web by mere presentation. The thing that works – is business as relationship built on the electronic and communication medium infrastructure. The existing trend towards electronic exchange of information, products and services within the context of electronic supply chains is greatly accelerated by, most obviously, the availability of a worldwide toolkit that has a common software interface and set of standards. These included the browser, Internet Protocol (IP), and in more and more parts of the world, low cost Internet Service Providers (ISP) and low-cost or free local phone call access to the ISP. Thus, a well-established decade-long evolution suddenly exploded and EDI became B-to-B. Similarly, the Application Program Interface (API) became a vehicle for first electronic out-sourcing and then linking your business to someone else's.

Telecommunication refers to the electronic transmission of signals/data/information for the purpose of communication using telephone, radio, television [Stair R. et al 2012]. The telecommunication media encompasses the material, equipment and infrastructure that facilitate the sending, receiving and interpreting the signals between devices. Figure 4.1 illustrates a typical wireless telecommunication medium.

Figure 4.1: Current Wireless Network



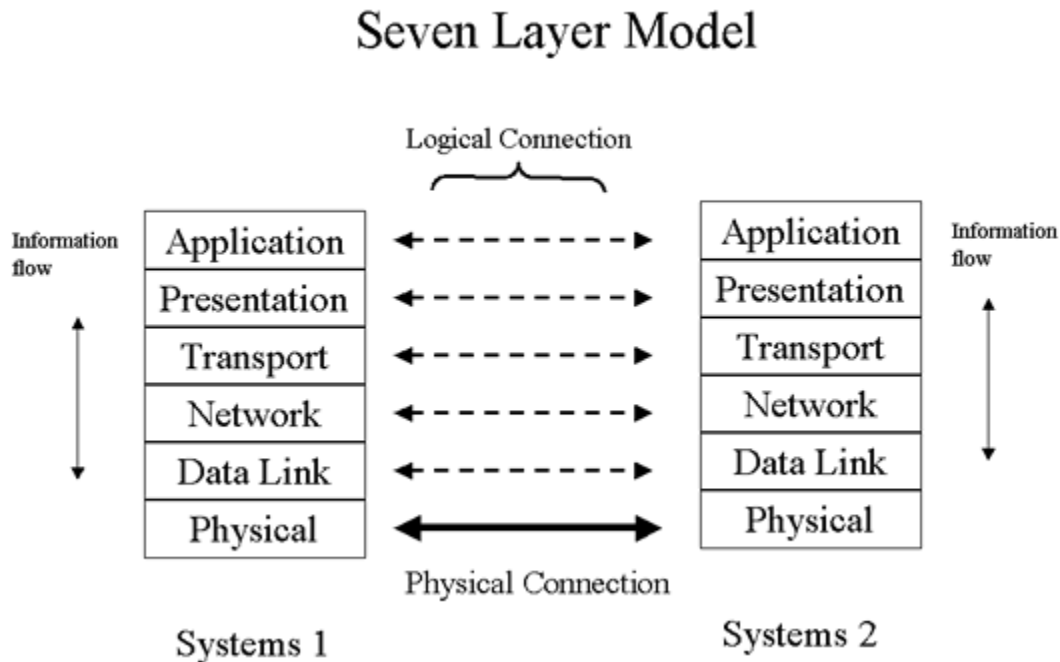
1. COMMUNICATION STANDARDS

Companies have agreed with Open System Interconnection (OSI), this means that they will make public the details of their communication standards and protocols so that others may adopt them to produce compatible systems. These standards allow:

- Equipment to communicate with each other
- Control of data flow
- Error free communications

The International Standard Organisation (ISO) has produced a communication model that has come to be known as the OSI seven-layer model (see Figure 4.2).

Figure 4.2: The ISO's, OSI seven layer communication model



2. COMMUNICATION MEDIA AND BANDWIDTH

Communication involves the transmission of information through a conducting medium this could be wire and fibre optics or air. In order to use the air, bandwidths or spectrum frequencies are needed for the region. Bandwidth is the amount or capacity used in transmission medium. The amount of data transferred through a bandwidth reflects its efficiency. Communication bandwidths in computer communications often refer to the maximum amount of information that can be transmitted over a particular medium or communications system. This bandwidth is generally measured in terms of bits per second (bps). A typical bandwidth can be 10-100mbps. The advances in digital communication technology and declining costs have significantly contributed to the development and expansion of Internet commerce.

2.1 Wired Transmission Media

Some of the main types of wired transmission media can be listed as:

- Integrated Services Digital Network (ISDN) service transmits information digitally through telephone networks without any conversion to analogue along the line. Special ISDN telephones are needed to convert digital format to analogue format.

Standard phones cannot be used to receive voice through ISDN unless a converter similar to a modem is attached to the phone to convert data to voice [Westland 2000]. With compression ISDN provides a high speed and relatively low-cost means of transmitting large amount of data over the telephone network e.g. teleconferencing is one of the services made possible through this technology.

- The twisted-pair wire: ADSL services can offer higher bandwidths up to 10mbps through copper cables. The system was introduced by Bellcore in 1989 and corresponds to the two-way capability of a twisted copper pair with analogue to digital conversion at the subscriber and an advanced transmission technology [Westland 2000]. ADSL uses the frequency spectrum between 0khz and 4khz for voice and between 4khz and 2.2Mhz for data over a twisted-pair copper line usually a telephone line. This line provides a data transmission capability of up to 10 mbps downstream to customer and up to 800 kbps upstream depending on the line length and network condition.

To compare each technology consider the minimum time required to download a three and half minute video clip: Over a 28.8 kbps ISDN modem this takes 50 minutes. With a 128 kbps ISDN modem the same clip takes 10 minutes. Finally the image will take 10 seconds over a 10 mbps ADSL line [Westland 2000]. The ADSL system will be more widely used due to the fact that it can be implemented over the existing copper wire networks with the capacity to offer high communication speeds for the advanced Internet e-Commerce.

- Fibre-Optics cable: is built on very thin strands of glass bound together and uses light beams to transmit signals. Provides a much faster communication capabilities and bandwidth compared to ISDN and ADSL. The medium guarantees a closer upload nominal speed of 10mps (see British Telecom advertising material).
- Broadband over Power Lines (BPL): signals are transmitted over standard high voltage power lines. A very effective way to bring internet access to rural areas where high voltage power lines infrastructure exists and other telecommunication media capabilities are poor or non-existent.

2.2 Wireless Transmission Media

The wireless transmission media has revolutionised communication, and has allowed countries and with no wired telecommunication infrastructure to be at the forefront of the latest technologies such 3rd and 4th Generation (3G and 4G) technologies.

The three main frequency ranges that telecommunication broadcasts are microwave (high frequency radio signal sent through atmosphere), radio (short range mobile phones) and infrared (sent through air as light waves).

Following the GPRS and wireless communication technology for mobile phones (2.5G), the 3G wireless communication has significantly improved mobile experience. Consumers can enjoy capabilities such high quality voice, video, multimedia, and internet access. This in itself has created an opportunity for businesses and commercial activities using mobile devices i.e. mobile commerce. The transmission speeds for 3G is between 2-4mpbs. The 4G technology will be capable of delivering 20-40mbps and up to 100 mbps which enables much better user experience, with live multimedia streaming at affordable costs.

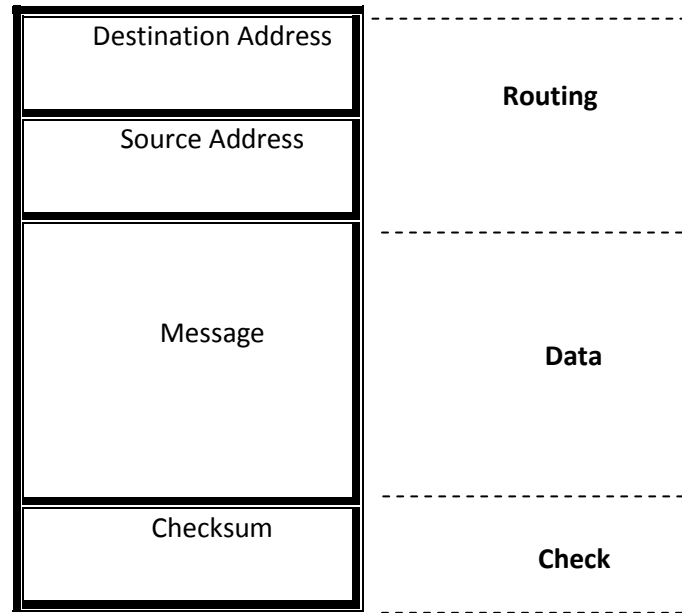
3. SYNCHRONOUS AND ASYNCHRONOUS TRANSMISSION

Transmission of digital or analogue information can be synchronous (simultaneous) or asynchronous. Voice traffic is normally synchronous since both sides talk at the same time therefore, they must be linked simultaneously. A voice mail is asynchronous communication since the sender and receiver are not required to be in communication at the same time. Synchronous data transmissions are capable of handling high volume of data at a given time. Data can be transmitted quickly with a fixed number of characters grouped together for transmission as a single block of data (packet) without breaks in between.

Synchronous communications require special characters or flags to be inserted at regular intervals to synchronise the time of both signals. This 16-bit checksum (e.g. CRC Algorithm) ensures the correctness of the communication. Also characters are inserted in front of data blocks regarding the address of recipient computer and signalling the destination that a new set of data is being sent to it. The data and its attached routing and checksum are called a packet. The format may vary based on different communication standards. Figure 4.3 shows a typical data packet in communications and networking. Synchronous data transmission terminals may

require storage or buffer areas because the terminal may not always be able to process or display data as quickly as it receives it [Westland 2000].

Figure 4.3: A data packet



Asynchronous data communications are simple and cheap but require two to three extra bits per character. Each character requires a start and a stop bit to signal the receiving computer that a character is being sent. A parity check is sent to determine if there was an error in transmission or receipt of data [Westland 2000]. Asynchronous communications are more efficient when the amount of data in each transmission is small.

4. COMPUTER NETWORKS

A computer network can be described as the result of any permanent or semi-permanent linkage between two or more computer system [Westland 2000]. Networks can be used to share resources i.e. data storage, share programs i.e. departmental software, share data files i.e. student records shared between finance/registry/department administration. Networks also provide access to specialised data processing applications, integrating and coordinating organisational information, and management of IT resources.

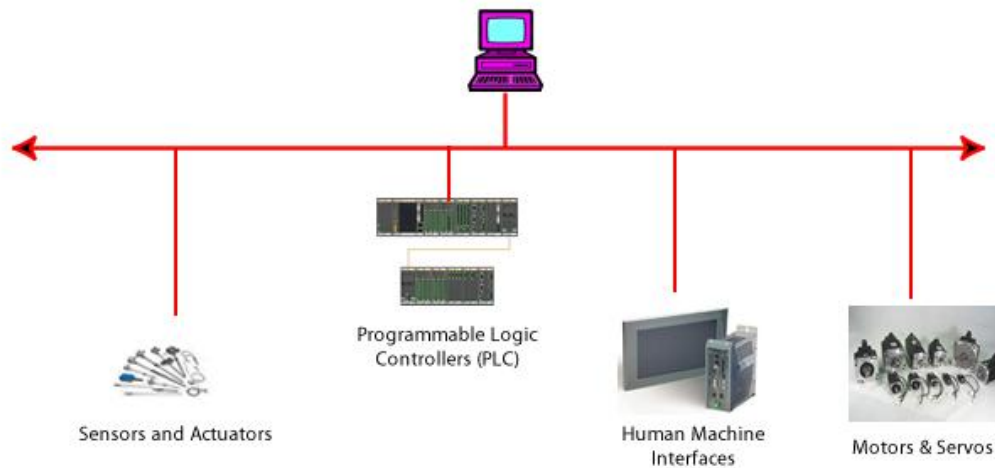
5. TYPES OF NETWORK

Depending upon the application one can determine the architecture of a network. Some

industry-based networks are represented in this section (Rockwell Automation Network Architecture).

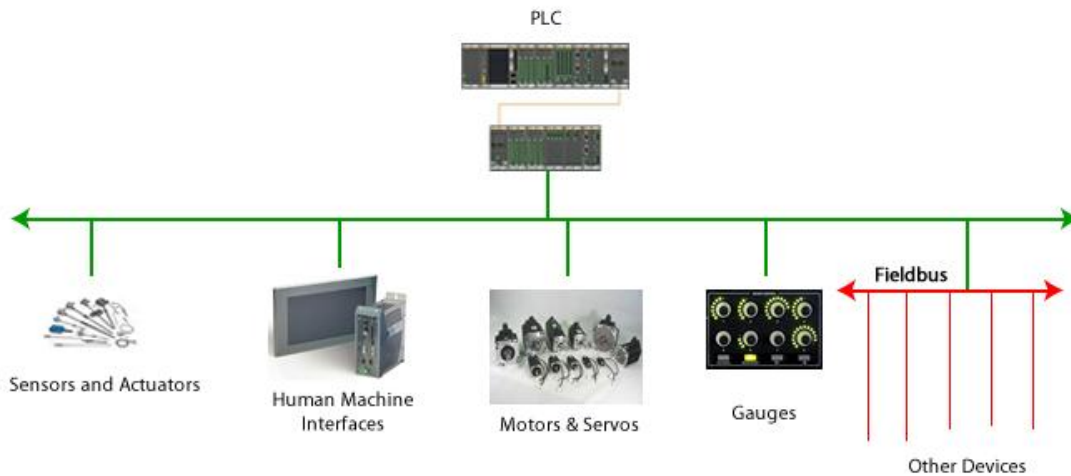
Control Network: Is an open, high speed, and deterministic network used for transmitting time critical information. It provides real-time control and messaging services for peer-to-peer communication. It is more used in industrial plants and connects PLCs, PCs, HMI devices (panels), drivers, motors and servos.

Figure 4.4: Control Network Architecture



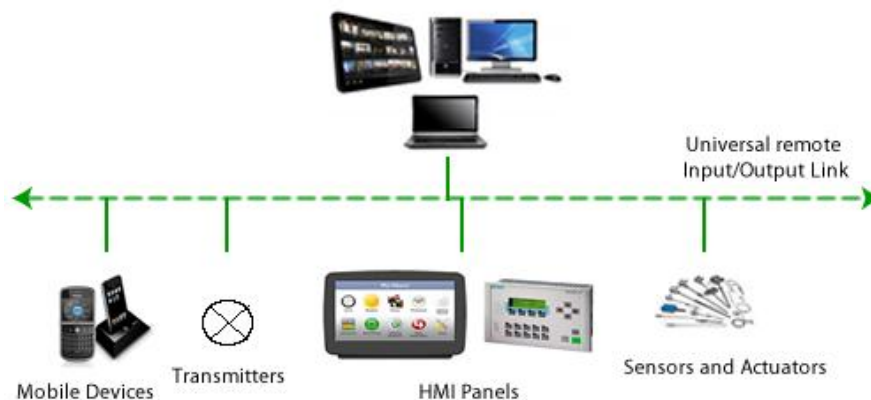
Device Network (DeviceNet): Is an open, low-level communication link that provides the connection between industrial devices (e.g. sensors and actuators) and high-level devices (e.g. controllers). It is based on Controller Area Network (CAN) technology that allows multiple vendor devices to work together.

Figure 5.4: Device Network Architecture



Universal Remote I/O Link: This network architecture is similar to DeviceNet with the advantage of the breadth of products it supports. Bluetooth the latest technology developed and currently being perfected, is a short-range radio frequency link intended to be a replacement for cables between portable devices and may fall into this network type. In addition to field devices that can be connected in this type of network PDAs, mobile phones and laptops can be synchronised and communicate with devices in the network.

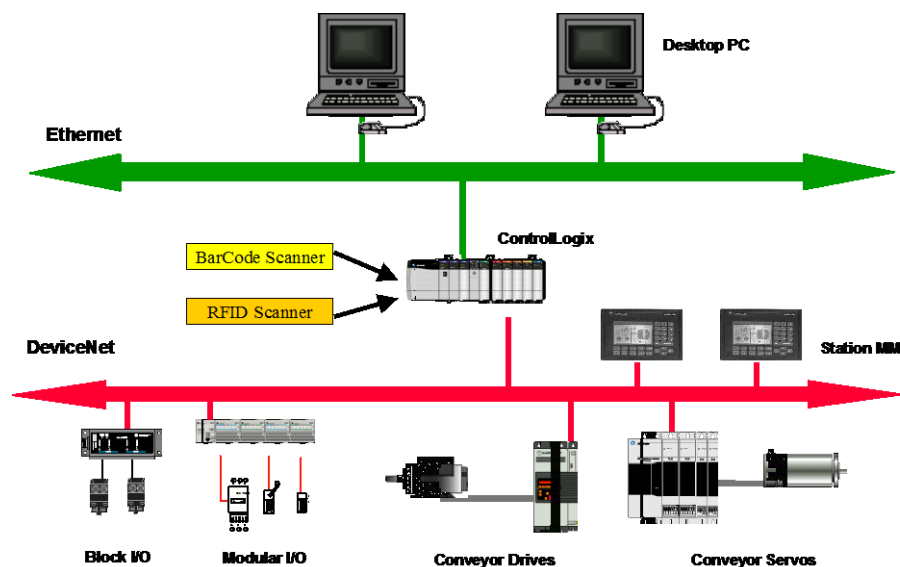
Figure 4.6: Universal Remote I/O Link



Ethernet Network: Using standard Internet protocols (TCP/IP), Ethernet network is a local

area network (LAN) designed for high-speed exchange of information between computers and related devices. With a bandwidth of 10 mbps, Ethernet networks allow many computers, controllers, and other devices to communicate onto a shared transmission cable or bus over a vast distance. In order to reduce the collision (see connection protocols section), a specific communication software was developed by Xerox Ethernet System called Collision Sense Multiple Access with Collision Detection (CSMA/CD). However, with all the preventive measures to avoid congestions and failures during traffic, Ethernet networks do tend to fail and cause problems.

Figure 4.7: An example of Ethernet Network (Rockwell Automation Network Architecture)



Internet: The Internet is itself the network of networks connecting computers servers using TCP/IP communication protocols. In order to enable systems to communicate with each other, it is important that common standards are developed and products that are produced meet the standards. *“The Internet is therefore, less a physical entity than a set of standards that different firms agree to follow for connecting their physical telecommunications capacity to enable global sharing of information across these interconnected networks”,* [Westland & Clark, 2000]. The

web is similarly a medium built of a set of standards that makes information sharing between computer systems possible.

Figure 4.8: Network types

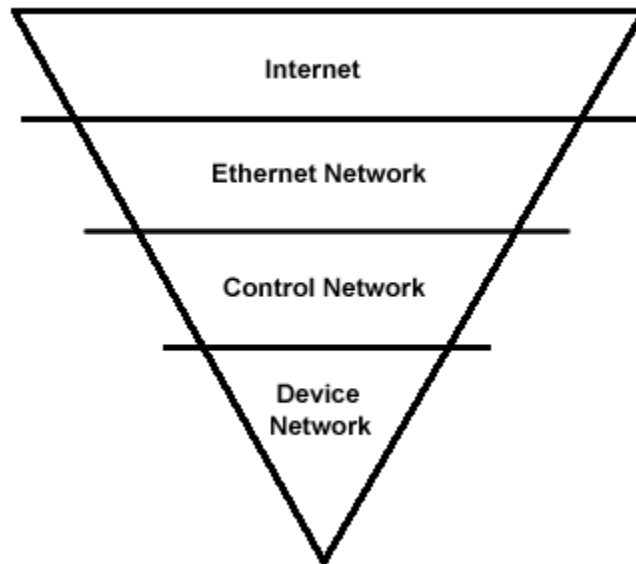


Figure 4.7 shows types of network with regards to the capacity and the level of data communication.

6. CONNECTION PROTOCOLS

Three types of connection protocols are discussed in this section.

Master / Slave Protocol: In this protocol one of the systems is considered to be Master and the others are Slaves. Slaves cannot send data unless they are instructed by the Master. The Master i.e. PLC sends a message granting permission to the slaves i.e. devices to send the data regarding their status or the information they contain. The slave then transmits the data when it is ready to do so. It sends periodic instructions (scan rate) asking the field devices such as sensors, actuators, transmitters, etc. (Slaves) for their status.

Token Protocol: A disadvantage of Master/Slave protocol is the large number of exchanged bytes before any actual data can be transmitted. An alternative protocol was proposed called the Token Protocol to minimise the number of redundant bytes exchanged. Here a token is

passed from one system to the other. Each system (origin) directly transmits the token to the destination system which is another element in the network. It checks the address and then transmits the packet of data to the destination node via the network. In other words these tokens act as carriers of data to destinations.

Random Access Protocol: CSMA/CD is proposed by Xerox Ethernet Systems. Imagine a group of people are talking in a meeting. If one wants to talk he/she waits until everybody else is quiet then they start talking. If they realise that someone else has started talking simultaneously (collision detect) they all stop talking. The electronic system exactly works the same it waits until the line is idle and then transmits the data.

7. NETWORKING CONCEPTS

Dynamic Data Exchange: Is an inter-process communications specification that is built into the Microsoft Windows Operating System (Rockwell Automation Network Architecture). It allows Windows programs that support DDE to communicate with each other within the Windows environment.

The easiest way to visualise how DDE works is to imagine a group of people talking to each other. These people represent different **Applications** (software programs) that run your PC. Some people ask questions (clients), some people answer (servers), and some people do both (client/servers). Clients request data and servers respond. DDE questions consist of:

- Whom am I talking to? (**Application** i.e. Excel, PowerPoint...)
- What is the subject of the talk? (**Topic** : contains the necessary information to get us communicating with a specific device for example Book1.xls, Presentation1.ppt...). A **DDE Project** consists of a number of DDE topics.
- What Data do I need? (**Item**, once application and topic are known what specific data is required i.e. ID number, name...)
- Is it a **Hot Link** or a **Cold link**: A **Hot Link** is a DDE channel that remains open, though it is only updated when the server detects a data change. **Cold Link** applications are

opened only on command.

A DDE example:

Application	Topic	Item
Excel	Book1.xls	(a cell address)
PowerPoint	Present1.ppt	A power point slide

Transmission Control Protocol (TCP)/Internet Protocol (IP): Is a suite of protocols that can be used to route information. The suite of protocols can provide addressing in LAN and WAN which can provide connectivity to a variety of hosts. The TCP/IP networking protocols consist of:

- TCP/IP address: Numeric identifier assigned to each host on the network. Allocating a TCP/IP address allows the software assigned to be mapped to the hardware.
- TCP/IP address format: A TCP/IP address comprises of 32 bits of information. These 32 bits are divided into four 8 bits (byte). For example 131.150.186.10.
- Network and node address: the network address is divided into two parts the network address and the node address.
- Network Class: Network classes are used to help determine how to subdivide the TCP/IP address into the network address and the node address. The three most common classes are A, B and C which is based on the size of the network.
- Subnet masks: A subnet mask is a 32-bit value that allows the TCP/IP protocol stack to distinguish the network address and the node address. For example: Class A network: 255.0.0.0, Class B: 255.255.0.0, and Class C: 255.255.255.0.

8. WEB CONCEPTS

1. URL (Universal Resource Locator): Are documents in hypertext on the web and each have a

unique address.

2. HTTP (Hypertext Transfer Protocol): Is the web's retrieval mechanism. The communication technology protocol that consists of a set of guidelines for the way in which programs at either end of a communication link can talk to each other.
3. HTML (Hypertext Markup Language): The logical structure of a hypertext document is described in HTML format. The Web pages are programmed with the Markup Language.
4. Firewalls: Are software installed to filter and control the transactions coming from the Internet to the company's Intranet. Firewall software services once installed on one or a group of computers tightly monitors incoming transactions for their content. The main function of these firewalls are to prevent the infiltration of unwanted contents, viruses, hacking, and deceptive threats from outside the system.

9. WEB ENABLING LANGUAGES AND SOFTWARE

In order to produce application software compatible to WWW, various programming languages have been modified and improved. Object Oriented Windows enabled programming languages such as Visual Basic, Delphi, C++, Java, J++ etc., have been designed to handle complex algorithms. Java has excellent programming facilities that make the language ideal for network applications.

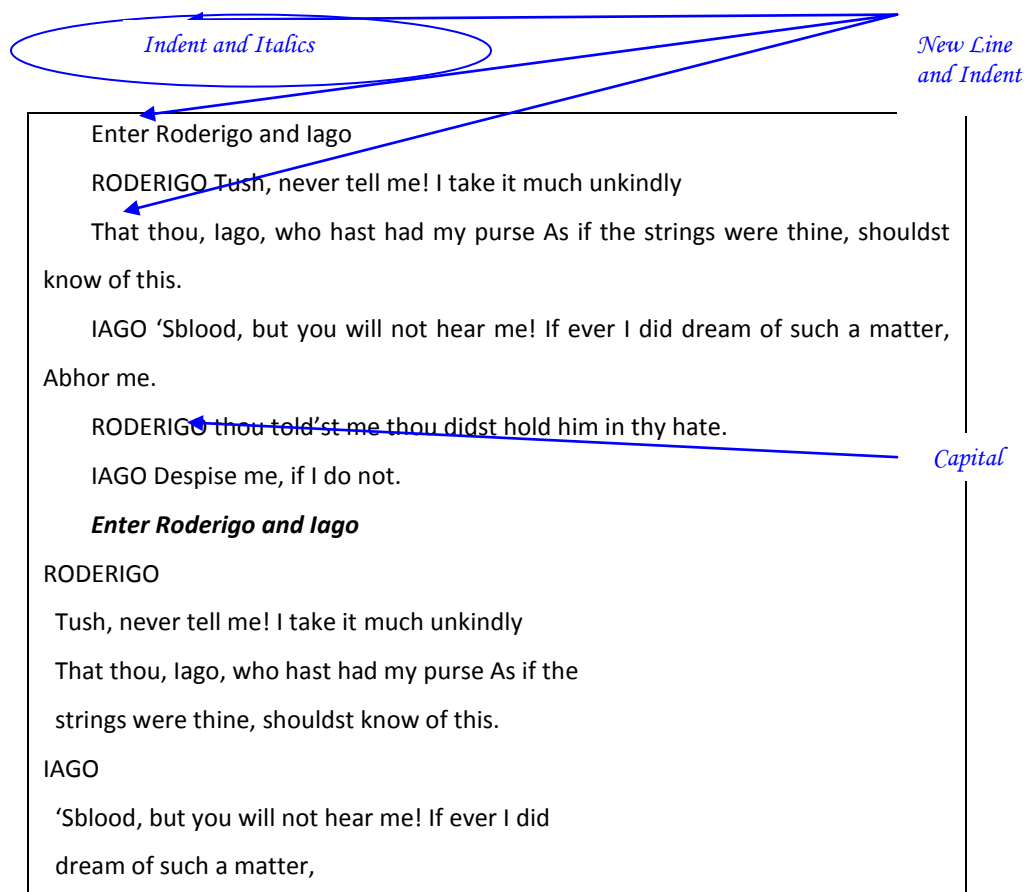
In addition, scripting languages i.e. VBScript and JavaScript have been designed based on their mother programming languages VB and Java to reduce programming procedures and time. Scripting languages, despite their limited capability to implement complicated algorithms and their longer execution time can reduce development time significantly. Scripting languages contain pre-designed procedures and functions to reduce programming time by developers.

In the following section we will discuss some of the web enabling programming software and languages.

10. MARKUP AND SGML (STANDARD GENERALISED MARKUP LANGUAGE)⁵

Since the beginning of publishing there has been markup. Markup is the term given to the instructions hand written onto the printer's proofs. These instructions ring changes and give the printer formatting instructions: i.e. 'bold', 'NewPara', 'New Line' etc. enabling the printer to correctly render the finished printed product. This pre-dates the WYSIWYG⁶ formatting seen by the modern text layout systems. WYSISYG systems have 'hidden' formatting marks placed into the file to instruct the rendering software how to display the desired effects.

Figure 4.9: Othello Act1 Scene1 Proof



⁵ The author would like to acknowledge Mr David Williams extensive contribution to this chapter especially the Markup, HTML and XML sections

⁶ WYSIWYG: What you see is what you get... a euphemism for the layout tools available in modern word processing packages.

Abhor me.
RODERIGO
Thou told'st me thou didst hold him in thy hate.
IAGO
Despise me, if I do not.

Figure 4.10: Othello Act1 Scene1 Amended

Figure 4.9 is an example of markup, the proof-reader has highlighted some changes, by pointing and ringing the text, with the associated changes they require (“indent”, “capital” etc). Figure 4.10 might be the representation after the changes have been applied. Markup was primarily concerned with the visual aspects of the information, and how to display it.

As the written word expanded, libraries found it necessary to categorise information, and standard library classifications were defined, aiding the indexing of these great tomes of data (for example the Dewey⁷ index system). With the advent of computer systems the volume of words and information was staggering. Technical articles too needed to be stored and indexed (to make them retrievable). The task was becoming all consuming; IBM, and others, saw an opportunity to extend their capabilities (and their revenues) through the use of software to aid the management and indexing of these data. Charles Goldfarb, a young IBM researcher, was charged with ‘building a system for storing, finding, managing and publishing legal documents’.

In the late 1960’s Goldfarb and two other IBM researchers (Ray Lorie and Ed Mosher) set to work and determined that the descriptive language necessary to achieve their task would be founded on three principles:

- Common data representation, Markup: Disparate systems need to read and write in the same format (to the same governing specifications).

⁷ Dewey decimal classification (n) a book classification whereby main classes are shown by a 3-digit number and subdivisions by numbers after the decimal point. Named after Melvil Dewey US Librarian died in 1931

- Markup should be extensible: There are limitless types of information; the language should not restrict the authors to 'fixed' markups.
- Document types need rules: There must be rules so that disparate systems can determine the exact meaning of the markup, shared by common document types... without ambiguity. The fruit of their work was a very complex language later formalized into SGML. Out of SGML have been taken various subsets, HTML⁸ is one such markup and it underpins the World-Wide-Web. *"SGML was designed as a formal markup language for formatting text and documents, and is widely used in industries such as aerospace, automobile and defence, where highly complex documents are common"*⁹.

10.1 HTML

HTML is a standard generalised markup language (SGML) specified by document type definition (DTD). In practical terms, HTML is a collection of platform¹⁰-independent styles (indicated by markup tags) that define the various components of a WWW document. The purpose of HTML is to provide structural meaning to the content of pages, that is the main task of tags [Goodman 1998].

HTML documents are ASCII (plain-text) files that can be created by any text editor i.e. notepad.

10.2 HTML tags

Elements are the fundamental components of a text document. Tables, headers, paragraphs, and lists are examples of elements. HTML tags are used to mark the elements within a text file for the browser. In other words HTML documents use tags to represent various elements. A tag instruction is confined in <> with the tag name in between e.g. <H1> and <\H1>.

⁸ HTML HyperText Markup Language, the markup language of the Web <http://w3.org/MarkUp>

⁹ Tim Jennings, Peter Bistow, Chris Dickinson, Steve Duke, Samantha Henry ,(2001),XML The Key To Business Integration, Butler Direct Limited, April 2001

¹⁰ A platform constitutes the hardware/software systems that offer the basis for further development. OS developers regard the microprocessor family (Pentium, PowerPC and CPUs) as platforms. Desktop application developers consider operating systems (MSDOS, Windows 98, NT, Unix, etc.) as platforms.

Some elements may also include attributes as additional information to the tag. For example alignment of images can be top, middle, or bottom and in case of text it can be bold and/or italic.

Every HTML document should contain certain standard HTML tags e.g. head and body where tags contain elements such as tables, paragraphs, and lists.

10.3 Dynamic HTML (DHTML)

HTML opened a new chapter in world business. Early website designers used HTML tags and electronic images to cater for business representations. With fierce competition in getting websites noticed the old vision of poor print page imitation of web pages, web browser makers and Internet standard bodies are expanding the capabilities of web pages at enormous pace [Goodman 1998]. Dynamic – pages are intelligent and flexible, they can “think and do” with little help from the server once they are launched.

DHTML is a combination of specifications that stem from multiple standards efforts and proprietary technologies that are built into two of the most popular web browsers, Netscape and Internet Explorer [Goodman 1998]. Efforts are being rendered at the standards bodies to standardise Internet related technologies. It is therefore very difficult to say that there is a universal standard for DHTML. However, in order to stay up-to-date on the latest developments, a developer should know all the relevant standards i.e. HTML, CSS, CSS-P, DOM, and ECMA¹¹. It is also important that developers and website designers keep themselves up-to-date with latest versions of software and browsers.

10.4 Internet technology standards

Here we will briefly discuss the recently implemented Internet browser standards that effect DHTML.

¹¹ **international industry association founded in 1961 and dedicated to the** Standardising Information and Communication Systems, their website: <http://www.ecma.ch/>

HTML 4.0: The new feature of HTML 4.0 in comparison with the older version (version 3.2) is the improved graphical interface and a wider alphabet library for example accommodating most languages and the style of writing in some of these languages i.e. left to right.

Style Sheets: How contents of a page should be presented is defined by style sheets. The way style sheets influence the representation of contents is either through tag names or elements. Style sheets describe how documents are presented on screens, in print, or perhaps how they are pronounced. By attaching style sheets to structured documents on the Web (e.g. HTML), authors and readers can influence the presentation of documents without sacrificing device-independence or adding new HTML tags¹².

The relationship between style and content is functional rather than conceptual. For example if a specific style of wrapping text, an image, or a group of elements is required. All the style knows and conducts is that a specific border with a particular thickness, colour, and type should be created around the contents. The style would not know whether the border would be wrapped around the content or not. In other words style is ignorant of the content and vice versa, this is how separation of content and style work.

CSS& CSS-DOM: Cascading Style Sheets is a style sheet mechanism that has been specifically developed to meet the needs of Web designers and users. A CSS file can be created and edited manually with a text editor, but one can also write a program in a scripting language i.e. JavaScript that manipulates a style sheet. This is in fact so common, that there are software libraries of useful functions available. *“To help in porting such program & libraries to different computer platforms, W3C has developed a specification called **CSS-DOM**, which defines a set of functions that all such libraries must provide¹³”*. The CSS Document Object Model is an **API** (Abstract Programming Interface) for manipulating CSS (and to a certain extent also other style languages) from within a program. An API is the specification of a software library. You can see it as a manual: it describes the functions and their parameters, but does not contain the actual

¹² For further information refer to World Wide Web Consortium website: <http://www.w3.org/Style/>

¹³ <http://www.w3.org/Style/>

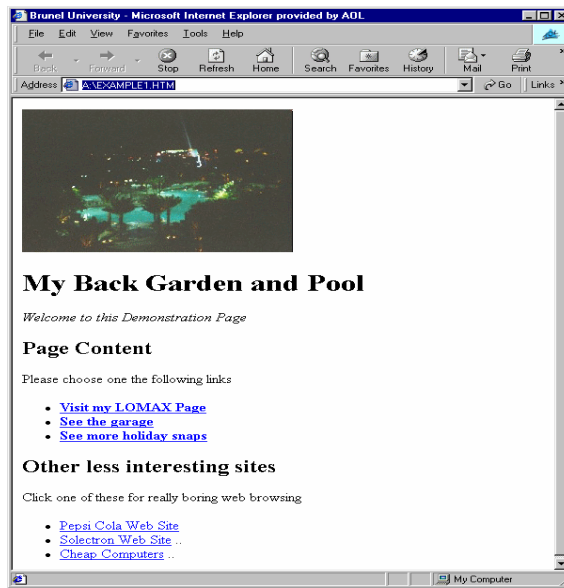
code. There are several CSS-DOM libraries available, for different platforms. Many of them are free. There are three types of cascading style sheets, CSS1, CSS2 and CSS-P [Goodman 1998].

Figures 4.11 and 4.12 show an example of HTML and the screen snap-shot of the code in using MS Internet Explorer Browser.

Figure 4.11: HTML code sample

```
<HTML>
<HEAD>
<TITLE>Brunel University</TITLE>
</HEAD>
<BODY>
<IMG SRC="Pool.jpg">
<H1> My Back Garden and Pool</H1>
<P><EM>Welcome to this Demonstration Page</EM></P>
<H2>Page Content</H2>
<P>Please choose one the following links</P>
<UL>
<LI><A HREF="LOMAX.HTM"><B>Visit my LOMAX Page</B></A></LI>
<LI><A HREF="GARAGE.HTM"><B>See the garage</B></A></LI>
<LI><A HREF="PHOTOS.HTM"><B>See more holiday snaps</B></A></LI>
</UL>
<H2>Other less interesting sites</H2>
<P>Click one of these for really boring web browsing</P>
<UL>
<LI>
<A HREF="http://www.pepsi.com"/>Pepsi Cola Web Site</A>
</LI>
<LI>
<A HREF="http://www.solelectron.com"/>Solelectron Web Site</A>
</LI>
..<LI>
<A HREF="http://www.ibm.com"/>Cheap Computers</A>
..</LI>
</UL>
</BODY>
</HTML>
```

Figure 4.12: Screen Snap-Shot:- Output From HTML Code Sample

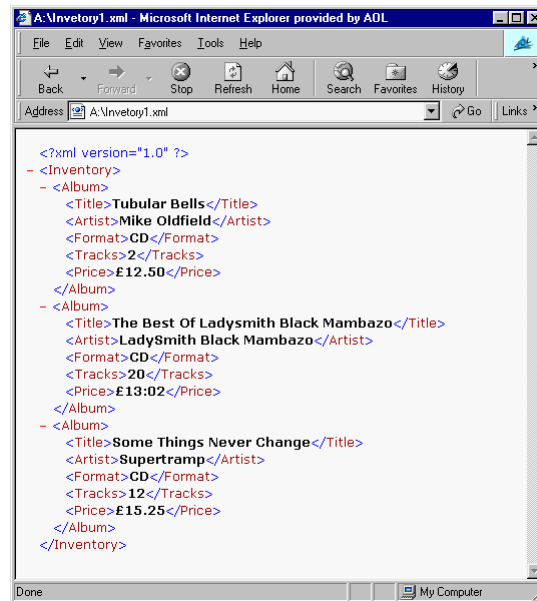


10.5 Extensible Markup Language (XML)

XML is a markup language borne out of SGML. It is constructed by markup tags and has the ability to describe the data associated with the content. Being a descriptive language, an XML author would simply write XML to describe the meaning of the data.

Figure 4.13 illustrates an example of XML code representing three database records. Each element is delimited by start-tag and an end-tag embedded within a nested structure.

Figure 4.13: XML code, Inventory containing Albums containing corresponding data

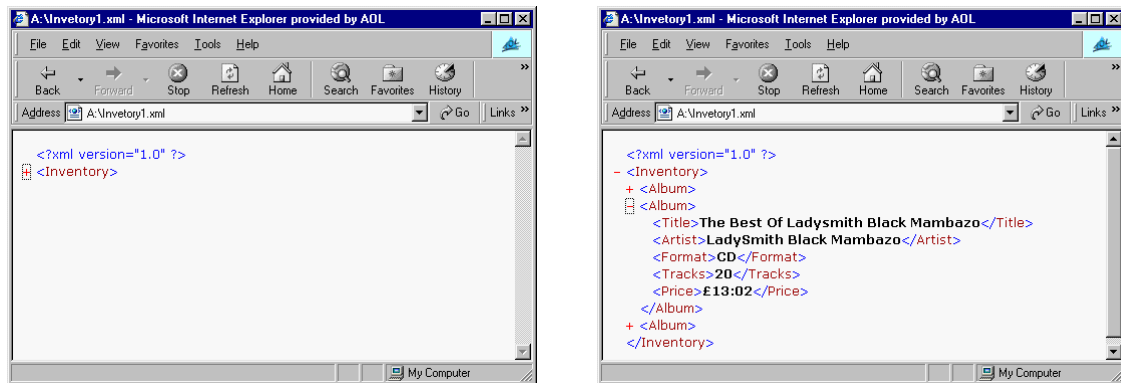


“Inventory” contains “Album(s)” that contain corresponding data such as “Title”, “Artist’s name”, “Format”, “Track”, and “Price”. The XML document is manreadable, easily understood and transportable record collection. The markup tags are not part of an XML standard; they are rather created by an XML author representing his analysis of the data. If communication with others were the aim then the authors would agree on their ‘standards’, or adopt someone else’s, and extend it to incorporate their particular extensible.

XML has been established as a recommendation since 1997 and is fully supported by modern Internet browsers¹⁴. The browsers display the coded XML illustrated in Figure 4.12 as a tree navigating +/- style. By clicking the +/- next to the XML structure will expand or collapse the data tree segment. Figure 4.14 shows the contraction and expansion of the tree structure.

¹⁴ Internet Browsers, freely available programs that are capable of displaying HTML and now XML (MicorSoft’s Internet Explorer V5.5+ and Netscape 6.0+) markup documents... commonly used to ‘surf’ the web.

Figure 4.14: Tree structure representation of data



These simple navigation techniques allow novice users to easily navigate the tree structure of an XML.

A comprehensive case study and analysis was conducted on proposing a reliable, articulate and boundless method of data transfer and sharing for a company seeking enhancement in its e-Commerce activities that is discussed in Chapter 10.

10.6 Java

Java is a platform-independent object-oriented programming language designed especially for Internet applications. Like other Windows based application software it supports graphical user interface (GUI) through Abstract Window Toolkit (AWT).

10.7 Java Virtual Machine

Most programming languages e.g. C, C++, Delphi, etc. require compilers to translate the program into machine code. Therefore an application written by these languages on a processor can only be run by other PCs if they also have the same processor. Java is a portable language, meaning that instead of producing codes that can only be read by specific processors Java produces bytecodes that can be read by Java interpreters. The Java interpreter is called Java Virtual Machine (JVM). The JVM is a virtual simulator of a processor; therefore Java can be read by any machine. The two common interpreters are Netscape and Internet Explorer. Java's success is due to its compatibility and portability in networks. It is the best programming language to-date for network applications.

Enterprise Java is the latest development in Java where modular organisational and commercial activities can be programmed in Java.

10.8 .Net15

.Net (pronounced Dot Net) is a software that allows Internet to be the basis of operating systems initiated by Microsoft. It facilitates the information sharing along the network or organisations free from hardware restrictions. It can be used to further enhance and increase the capability of e-Commerce systems. .Net connects information, people, and devices. It extends clients, servers, and developers' tools and consists of:

- .Net Framework: is the programming model in the .Net environment for building and running web-based applications, smart client applications, and XML web services. It reduces development time by offering developers modular connectivity where the developer can concentrate on the business model.
- Developer tools: provides a rapid application integrator (Microsoft Visual Studio®) for development of programming environment with the .Net Framework.
- Set of servers: including Microsoft SQL Server, Microsoft Windows 2000, Microsoft Commerce Server, and Microsoft BizTalk Server integrate, run, operate, and manage XML Web services and applications.
- Client software: provide the platform for system integration. Windows XP and Microsoft Office XP are such software.

10.9 .Net Enterprise Servers16

The Enterprise Servers developed by the software giant Microsoft tends to offer an enhanced electronic support system to maintain organisational agility. We will briefly discuss two of these servers:

¹⁵ For further information refer to Microsoft website: <http://msdn.microsoft.com/>

¹⁶ For further information refer to: <http://www.gotdotnet.com/>

- 1) BizTalk™ Server offers a platform for modular and secure business process builder free of OS and programming language restrictions¹⁷.
- 2) Microsoft Commerce Server is even less complicated to use. It offers e-Commerce solutions by providing frameworks, customer relationship interface, and customer feedback analysis.

SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *What is meant by computer networks? What are the key components of a typical Wireless Communication infrastructure?*
2. *Explain the following industrial networks: Device Network, Control Network, Ethernet network.*
3. *A computer manufacturing and assembly company is planning to establish an online commercial activity by allowing customers to browse products and order. Which type of m&e business model you propose and why? Secondly, explain in detail the suite of technology from customer interface all the way to factory shop-floor control systems. List and explain the suite of technologies, software and network capabilities you recommend.*

¹⁷ For further information refer to: <http://msdn.microsoft.com/library/default.asp>

Chapter 5

VALUE NETWORKS

The Internet originated in 1965 as a scalable (offering users the same performance regardless of size), fault-tolerant (ability to recover and operate despite damage to one or more components), proprietary (privately owned and controlled) military-university packet switching network. In 1995 Internet became available for commerce. This chapter presents the key characteristics of the Internet and their relevance with the creation of value networks.

Internet enabled commerce (m&e commerce) includes electronic trading of physical goods and intangibles such as information. This encompasses all the trading steps such as online marketing and advertising, ordering process, payments, and support for delivering. M&E Commerce normally includes the electronic provision of services, such as after sales support or online legal advice. It is also a platform for collaboration between companies, such as collaborative provision of physical products, services, consultancy, and engineering solutions.

Internet Commerce has grown fast for the following reasons:

- The emergence of highly capable mobile devices that allows access to the internet and electronic processes at any time-any place. This access is possible for employees, partners, customers, and any other stakeholder in the value chain.
- Internet enabled business and commerce has a low running cost compared to other modes of business operations implementation. Apart from development and server costs a web presence with e-mailing facilities on its own does not impose major running costs.
- With low entry cost you will secure fast return on investment (ROI), eliminating paper work, ensure fast response and immediate cost savings.
- Internet commerce has a substantial critical mass, which attracts even more users and provides technology and business solutions. In addition governments and public

authorities worldwide actually promote the use of Internet for businesses.

- Internet commerce is a technology driven by an innovation cycle of continuous opportunity creation as a consequence of a very rapid progress of mobile and electronics commerce technologies.
- Cloud communication and computing services is becoming a major force in reducing capital cost for smaller businesses. A company with major internet presence and electronic provision of services does not necessarily require dedicated in-house hardware anymore. Companies can now lease or rent electronic storage (databases), electronic processes (part or total business processes), internal and external communications and computational facilities from larger institutions. For example, Google and Amazon are already selling Cloud services for individuals and small to medium size enterprises.

1. COMPETITION AND EXPANSION IN THE MOBILE AND ELECTRONIC BUSINESS ERA

Businesses compete and expand based on the following principles:

1. Level of functional integration, providing convenience, cost reduction and new opportunities for the customers.
2. Network integration, parties are connected together via the WWW. A single system may act as a sector-wide infrastructure for trading and related activities providing convenience and cost reduction.
3. Branding, collection of products or services under an umbrella of a brand name.
4. Global presence.
5. Technology ownership – intellectual property.
6. Business knowledge.

7. Merger and Acquisitions; to expand into new markets, increase technical and financial capabilities, improve the portfolio of intellectual property.
8. Internet enabled integration of information and functionality adds value. This is facilitated most if the provider is capable of combining the Internet with back-end processing.

2. VALUE NETWORK AND DYNAMIC MARKET

A **value network** is a multi-enterprise network of relationships focussed on integration of information flows to exploit information and knowledge in the network for strategic business objectives [Timmers 2000]. The focus in value network is to increase value through electronic processes and relations. The type of relations can be opportunistic and short term or strategic and long term. Each has their own advantages during the business's life cycle.

Business-to-Business or Business-to-Consumer electronic commerce key to survival is competition and collaboration in value networks and dynamic markets. The possible scenarios of competition and collaboration can be listed as:

1. Engaging in value network: Companies form multiple strategic alliances to meet demands. These networks of companies seek enhanced customer value by minimising cost and reduced delivery time through their web of partners. The network optimises service to consumers through a comprehensive data management system which flows and is shared among the network of business partners facilitated by Intranet and Internet.
2. Transacting in dynamic markets: Companies and markets are becoming increasingly interwoven and interchangeable. Companies use dynamics of markets for buying, selling and contractual relationships. New market mechanisms enable products and services to be traded that were previously locked inside companies.
3. Expansion on information: Digital information is becoming an expensive commodity, companies collect and store information from different sources in a knowledgeable format and they themselves become sources of value added information. Their business

models include direct and indirect acquisition of revenue from digital information.

4. Converging B-to-B and B-to-C e-Commerce: The advantages of Business-to-Consumer customisation concepts influence the Business-to-Business relationships. Conversely, product and service management and marketing concepts of Business-to-Business will have positive effects on Business-to-Consumer relationships.
5. New technologies, new business concepts, new policies, and new regulations: A systematic view of constant changes. Advancement in technology and information formats, new business relationships and models, constant changes in rules of the game, and favourable government policies will help to maintain the vibrancy and dynamism of business models [Timmers 2000].

3. *COMPETING AND COLLABORATING IN VALUE NETWORKS AND DYNAMIC MARKETS*

In a quest for efficiency and agility companies need to continually reassess their activities, products, and services. They need to establish strategic relationships and maintain a strong network. Consistent modifications and improvements to products and services based on customer requirements are essential in surviving in a dynamic market place.

4. *PARTICIPATING IN VALUE NETWORKS*

The value network configuration is mainly based on virtual enterprise and business process re-engineering philosophy. Value network configurations utilise shared information that supports business functions across the companies in the value chain.

The future of value network of B-to-B e-Commerce will increasingly engage in a variety of relationships with industrial partners be it with suppliers, distributors, information brokers, trusted third parties or other intermediaries. The objective is to realise the short-term and long-term business objectives [Timmers 2000].

5. *CHARACTERISTICS OF VALUE NETWORKS*

A number of observations can be made about value network configurations:

- Value networks are not formulated fixed entities in terms of integration and collaboration levels.
- Value network makes SME look more resourceful and help large enterprises in outsourcing.
- A common set of tools and language is required for organisational and technical integration i.e. EDI, ODBC, PDM, etc.
- A common online central database system is to be shared throughout the system. Databases storing information regarding customers, products, and design information.
- Shared information ownership instead of horizontal and vertical data ownership thus creating a dynamic and integrated network of ownerships. The dynamic network ownership will enhance network value by exercising control through interconnection of information flow.
- Linear relations (supply chain and value chain) are the dominant arrangements for a value network. The network configuration may include 1:N, N:1 and N:M. Such configurations may have interesting added value opportunities by introducing dynamic market elements.

6. VALUE NETWORK PRIORITISATION

An electronic business is much more than a user friendly and sophisticated website. It is a process that involves a network of players. One of the major opportunities that the WWW provides is the limitless expansion for networking. It extends its reach across the supply chain, thus reducing its own procurement costs while helping manufacturers to better plan their production schedules through shared information. It can include the best shippers, research information providers, financiers, raw material suppliers and any other relevant information in its site by providing links. It facilitates customisation and collaborations with customers by building communities and brands. It links to new intermediaries such as agents, facilitators and brokers. It reaches out to subsidiaries and other companies that can extend the company's appeal and value by providing products and services that are entirely out of its own sphere of

capabilities [Keen 2000].

7. ROLES WITHIN VALUE NETWORK

The main objective of e-Commerce is to generate added value through network. A value network should concentrate on the roles each company plays in the network. These networks based on their dynamics and economics will define various roles for each individual company. At occasions the company can be a supplier, an intermediary or a customer. One may think that links and connections in the websites are just extra features, ignoring the relationship dynamics each link embeds in them.

8. TRANSACTING IN DYNAMIC MARKETS

Digital online marketing has created exciting opportunities to further enhance the dynamics of markets. It has enabled:

- Buyer / seller coalition: Buyers and sellers form coalitions and engage in the market negotiations to increase purchasing and sales power.
- Dynamic product / service batching: By recognising purchasing patterns buyers and sellers are guided towards complementary products and services which create additional marketplaces where necessary.
- Flexibility and learning while negotiating: Buyers and sellers can exercise negotiation skills where characteristics of the product / service can be improved.
- Transient or ad hoc markets: In addition to predefined and categorised markets with specific operations, digital online markets facilitate ad hoc and temporary business opportunities.
- Customisation and Quality Assurance: Improved products / services will be on display even prior to their launch. Customers are able to give their feedbacks and requirements for improved design. This not only assures the seller of the potential of the market it also gives the customer the feeling that they are involved in designing

the product / service, hence encouraging loyalty to brand (also see CODARU).

9. TRADE-OFFS IN DYNAMIC MARKETS

Conducting business in dynamic markets requires certain trade-offs. On one hand dynamic markets are based on developing new relations and on the other hand they are consolidating current relations. Customisation can lead to longer delivery times. In-sourcing is a method of cost cutting, however; this may be at the cost of flexibility and customisation. Increased flexibility leads to increased complexity. Ownership of information, intellectual property rights, security liability and cultural clashes are among the issues that affect dynamic markets. The larger the number of firms in the network the harder it will be to acquire customer confidence. This is why branding will play a major role to enhance and consolidate the overall view of the network [Timmers 2000].

Table 5.1: Building assets value network vs. dynamic market

	<i>Value Network</i>	<i>Dynamic Markets</i>
<i>Access to markets</i>	For complex products where there is limited access to the market. Especially B-to-B niche markets.	For simple mass-customised products.
<i>Brand</i>	Quality product, image being an important factor.	Awareness, the market is widely known and accepted.
<i>Cost leadership</i>	Dependent on process optimisation for cost reduction e.g. consortium of partners sharing a project.	Product price is the decision factor. Getting the cheapest offer in the fastest possible time e.g. flight tickets.
<i>Customer service</i>	For complex and specialised services.	Standard but robust service with simple products as a package.

<i>Customer loyalty</i>	Customer trust is an issue especially handling complex customer information.	Customer loyalty is based upon lowest price or fastest service.
<i>Network integration</i>	Creation of exclusivity in business relationship	Making sure the firm is the reference point for commercial relations.

10. ECONOMICAL IMPACT OF E-COMMERCE

With the expansion and prevalence of Internet technology substantial information on products and services has become available to customers. Reduction in overhead costs due to lower margins, market transparency of suppliers, customers, and products has lead to lower prices. Significant shifts occur in financial flows along inter-corporate value chains. Two scenarios are explained as an example of how ISPs and Content Providers economy function. In the first scenario, content providers directly charge the customers who not only have to pay for the information but also the Internet Service Provider (ISP). The second scenario is that the content provider receives payment from the ISP. That is, the ISP pays a percentage of customer subscription fees to the content provider [Hackney/Loebbecke 2000].

11. MARKETS AND COMPETITION

Basic services offered by third-party marketplace providers include:

- Web presence of product on offer,
- Web enabled marketing,
- Virtual catalogues on the web,
- Multiple catalogue marketplace,
- Order registration and processing, either by passing the information to the buyer or automatically being connected to the suppliers inventory database,

- Financial transaction handling, and
- Logistics handling.

Characteristics of electronically enabled industrial markets:

- Globalisation: The Internet has increased global sourcing, global buying and selling, and global supply. Location becomes a trivial issue.
- Customisation: Due to instructiveness of Internet and website customers are able to influence customised design and negotiate price online.
- Networking: Value is delivered to the customer through a network of partners.
- Flexibility: Systems are more flexible. Customers are able to interact with systems under different circumstances.
- Branding: Brands become sources of value where transaction costs are reduced, there are greater choice, and buying and selling can be done remotely [Timmers 2000].

12. ECONOMIC SCENARIOS¹⁸

Traditional companies normally run on low fixed cost and relatively low operating margins¹⁹. In the manufacturing sector, the pre-tax margin is typically around 5%. In financial services, it ranges between 7-12% [Keen 2000]. If the financial gains go below breakeven point the company experiences small losses. Subsequently it experiences small gains when financial gains increase at specific levels e.g. 5%.

An online business has got a different structure. The fixed costs are largely dependent on the customer acquisition activities and technology e.g. ISP, network, software and hardware.

¹⁸ Note: For further information refer to, Keen, P and McDonald, M. (2000), The eProcess Edge, Creating Customer Value and Business Wealth in the Internet Era, McGraw-Hill.

¹⁹ Margins: Revenues less variable operating costs, infrastructure and customer acquisition investment.

Traditional assets in this business model are out-sourced to other value network members. Normally, online business can be operating on margins of around 30% on repeated business [Keen 2000]. Companies such as lastminute.com are examples of this system. However, margins can go up to 70-85% in auction sites (e.g. e-bay.com). A major cost factor for online business is the customer acquisition factor. Companies may fall into fierce competitions for winning customers by increasing their customer acquisition costs and may exhaust their resources with devastating consequences.

The key to e-Commerce success is to release margins through generating business without heavy reliance on customer acquisition investments. This will happen once companies have created a reliable customer relationship and loyalty. The relationship and loyalty creates repeated business and consequently will reduce marketing costs resulting into increased margins.

13. A SUCCESSFUL E-COMMERCE

In order to be successful in e-Commerce the business model should cater for:

1. Enhance the value-adding intermediary role of the company,
2. Consolidate long-term relationships,
3. Perfect logistics and utilise resources,
4. Customisation of websites by creating user profiles making things simple for customers,
5. Brand building, co-operate with other companies in the business to create high quality branded products and services,
6. Become global and break the boundaries by embracing different cultures and customise products and services to fit special requirements for different cultures, and
7. Assessment of the *capability of the system* to achieve maximum efficiency.

14. SYSTEMS CAPABILITY

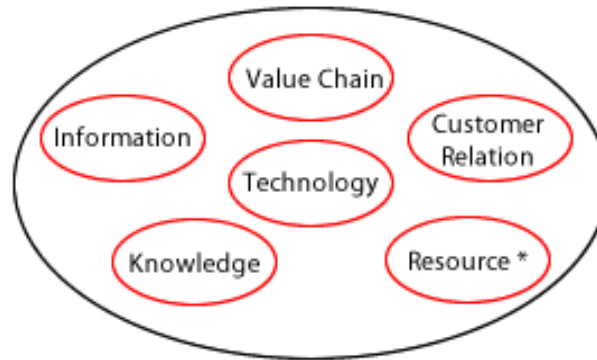
Keen et al (2000) define process capability as: *“The combination of tangible and intangible assets the company deploys in conducting its business”*. The tangible assets include its technology, and if it is an established company not an Internet-only online company, its branches, infrastructure, and facilities. The intangible assets are the information, processes, and organisation that leverage the facilities and assets [Keen 2000]. It can therefore be derived that, internal and external constituents of systems reflect the capability of industries. Capability Evaluation Route and Optimisation (CERO) is a method to assess capability of a given system [Rahidinejad et al 2002].

Systems capability can be enhanced by proper implementation of processes and identification of the relationship between various elements that constitute your e-enabled system. Depending upon the nature of their business e-enabled commercial systems may contain some or all of the following elements:

- Information: Collection of related data regarding technology, competition, market, regulations, communications, technical infrastructure, cultures, and people.
- Resources: In-house resources, out-sourcing, equipment, machinery, software, hardware, human resources, skills, and assets.
- Logistics: Facilities, suppliers, transport, delivery systems, inventory and supply of material.
- Knowledge: Intellectual assets, know-how, research capacity, deliverables and degree of success in achieving results.
- Value chain: Co-operations, interrelationships, added value activities, and joint ventures involving other companies.
- Customer relationship: Marketing, mass customisation, solid relationships, loyalty, and community building.
- Technology: Ability to acquire, appreciate, use, and utilise the latest technology to

maximise efficiency.

Figure 5.1: m&e Commerce capability



* Resources: Human, Equipment, Machines, ...

The capabilities of systems can be maximised once the elements are defined, their relationships are understood, and strategies to achieve goals are identified. It is important for an m&e-Commerce entrepreneur to realise the systems capabilities and utilise these capabilities to generate wealth.

SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *Explain why m&e commerce has grown so quickly (6 reasons).*
2. *What is a value network and what is its relationship with Dynamic Markets?*
3. *What are the key components of m&e commerce capability? Explain each of those components and their role in projecting capability.*
4. *Explain building assets value network vs. dynamic market use Table 5.1 for this purpose.*

Chapter 6

E-BUSINESS, PRODUCT AND SERVICE CUSTOMISATION

In pursuit of customer satisfaction, any company must re-think its strategy and re-engineer its processes and products to meet the ever changing customer demand. The focus of the company should move from the product to a more holistic view; the **solution** from the perspective of the user. It must be recognised that the user requirements and perceptions will vary widely across the target market from customer to customer, they will vary with time and they will usually be influenced by competitor's products. This multi-dimensional dynamic tangle of information must be analysed as an on-going process in order for it to be of practical value.

M&E businesses are in the best position to embed customer requirements and satisfaction in their e-Processes. The continuous engagement of the consumers via their mobile devices and the integration of their feedback into the e-Processes allow companies to adjust their services. This integration can now be in real-time. However, only a suitable data acquisition and analysis platform will truly make the right impact on the company and its relationship with its customers.

Market analysis is not confined to customer input and feedback. It should involve gaining awareness of all factors influencing the market in which a company operates such as: competitors, suppliers, economic, technological, and legal among others. It is crucial to have a 360° view of the company's position at any moment in time in order to be able to make informed decisions. However, this chapter will limit discussion of market research to customer communications, as it is this input that is fundamental to the statistica™ application discussed later in this chapter.

It is firstly important to identify what is meant by the customer. Does it mean the end user, the purchaser, the decision-maker, the influencer, or all of them? This question becomes more difficult to answer on large B-to-B transactions where there may be many parties involved. The most realistic way around this situation would be to gather knowledge from all sources, where possible, and apply a weighting to each based on an estimate of influence on the buying decision. In general, companies try, through listening to their customers, to piece together an

overall picture, often called the Voice of the Customer (or VOC), which is a way of including their perspective in strategic decisions. In providing an optimal service to the individual, it would be better to leave the macro view of collective customer requirements and apply attentions at a micro level to the desires of each in turn. Of course on a large scale, the information handling this entails, is a very complex operation and the data collection process must be carefully designed to reflect the customer's viewpoint clearly, avoiding misinterpretation.

1. MARKET RESEARCH

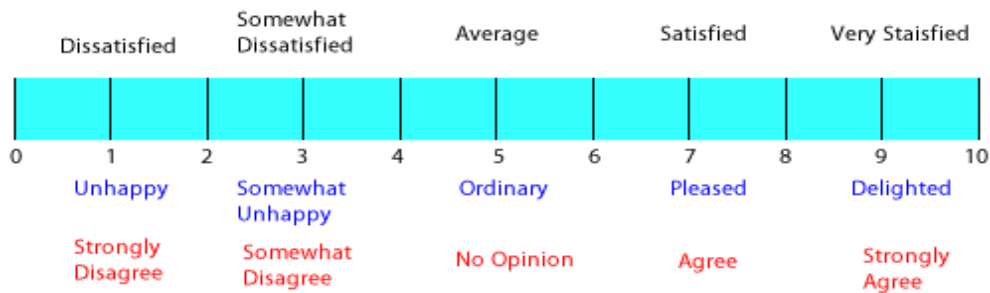
Market research plays an undeniably strong role in product developments. Therefore, seeking customer perception and feedback should form the basis for decision making. The questionnaire is a popular source of information as it is easily distributed, results may be compared like for like, enabling easy processing and analysis and it is generally an economical exercise. The methods of distribution in the WWW are e-mail and on-line forms.

Ratings scales are a popular method of formatting questions to provide numerical answers, however there are points to be considered when choosing the best approach:

- Scales are prone to positive bias – particularly when using points system (e.g. 1 – 10) rather than descriptive options (good – bad)
- Numbered scale is left more open to various interpretations than verbal (i.e. rating of 7 is considered “satisfactory”) – see figure below.
- Scale without midpoint is even more prone to positive bias.
- For a verbal scale, answers may be rated as subjective (e.g. “satisfied”) or objective (e.g. “good”). Empirical research shows that objective scales produce more realistic results, as the respondents are able to disassociate themselves better from the answer.

Figure 6.1 shows how people may place response categories on a scale of 0-10.

Figure 6.1: The subjective questionnaire and response design. Normally rely on statistical analysis or arbitrary numerical scales (e.g. 0-10)



2. CUSTOMER OPTIMISATION ROUTE AND EVALUATION (CORE)

Internet technology has greatly contributed to customisation of product and services. Manufacturers and service providers can directly communicate with their customers via electronic means with no limits. This helps in reducing duplication and scrapping due to the fact that the customers are at the forefront of design and development.

The following section will discuss CORE algorithms and software for customer satisfaction evaluation (statisticaTM)²⁰. statisticaTM for customer satisfaction evaluation can be considered as a powerful software tool in e-business environments. It is capable of gathering customer information and requirements, evaluate their satisfaction towards specific product attributes, allowing for the utilisation of the resources within the capability spectrum of a company to deliver the final product. The CORE algorithm can enhance relationships and partnerships by concentrating on customers' needs and optimising production/service process by minimising the number of resources required based upon manufacturing/service constraints.

2.1 Why CORE?

The consumer market is evolving at an incredible rate, competition is getting fiercer, catalysed by technological developments improving business capability. Where many consumer-

²⁰ To access the software refer to <http://www.statistica.com> web site.

centric initiatives fail is the integration of real-time knowledge of user requirements and adapting their daily business processes accordingly.

The product focus has evolved from being purely design led to incorporating a higher service component. Whilst excellent, innovative design will always prevail, once optimal levels have been reached, companies may look to include service benefits to add value and maintain competitive advantages. This way, they are less vulnerable to design plagiarism by industry rivals and may use the service channel to maintain the communication with their customers post-sale.

By maintaining a relationship with the customer following the initial sale and continuing to offer them after sale service, the company is then in a very strong position for return business.

Whilst previously a bespoke design would carry a huge cost premium due to the man hours and communication involved in development, the Internet can form a design interface where, with suitable supporting e-processes, customer requirements can be processed automatically, propagating a custom design for use by manufacturing. Imagine designing your customised pair of jeans or your suit.

Companies should not only use the Web as purely an advertising medium to increase company profile, but also use the Internet to create customer relationships and enhance companies' e-processes.

Companies must focus their activities towards delivering a complete customer solution, broadening the scope of quality throughout the value chain. From product conception through to after-sales service, the process is designed with the customer as the focus. Speed of response to both market developments and customer orders is now a key order winner. Those companies striving for a Total Quality approach are now concentrating their resources on building flexibility and speed in as an inherent part of their entire business processes.

2.2 How does CORE work?

CORE [Mousavi et al 2001] is a mathematical model designed to bridge the divide between customers and product designers in pursuit of maximising potential customer satisfaction. By

translating customer's qualitative requirements into technical design attributes, satisfaction to the product as a whole and its constituent elements may be attained. Hypothesis testing, using the model, would prioritise areas for improvement.

CORE draws on many of the principles already discussed, the fundamental elements being:

- ***Customer led***

By using data gathered directly from customers as the input to a decision making tool, information integrity is ensured. As CORE provides a common language between customers and designers, there is no intermediary translation stage where facts can become blurred with management's interpretation or influence.

- ***Quantifiable approach***

Whereas other customer-focused methods rely largely on subjective opinions, translating this into coherent numerical form enables more rapid analysis, saving time in the development cycle. It also provides meaningful data on which to rate current success, but more importantly, make future improvements.

- ***Systematic method***

Like Quality Function Deployment (QFD), CORE takes an orderly approach to the data retrieval process. By combining attributes of interest with appropriate weighting factors, all data may be captured and used in a manner consistent with its significance. It avoids the "insignificant many overshadowing the significant few" syndrome.

Any product may be broken down into constituent attributes, be they tangible or intangible. These may be identified from the perspective of both designers and customers and a numerical variable assigned to each. Any given customer will have an ideal value for each attribute and the deviation of this from the actual design value may be calculated:

$$\varepsilon_{ij} = \left(\frac{v_i - v_{ij}}{v_{ij}} \right)$$

i: product attribute

j: customer

v_i : actual design value for attribute i

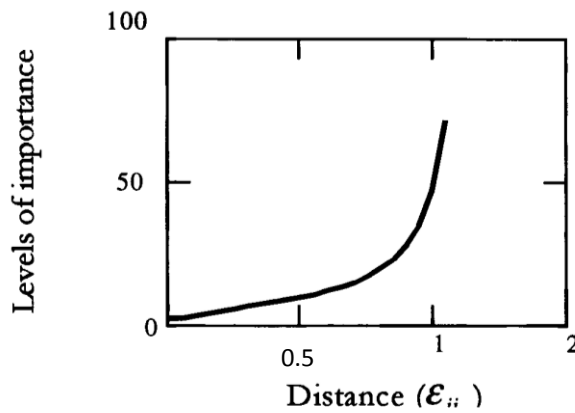
v_{ij} : ideal design value for attribute i and customer j

ε_{ij} : distance between actual design value and ideal

In addition to the value customers associate with a product attribute it is necessary to consider the importance they place on that attribute. The importance is a function of the ideal/actual deviation as previously calculated, $\alpha_{ij} = g(\varepsilon_{ij})$.

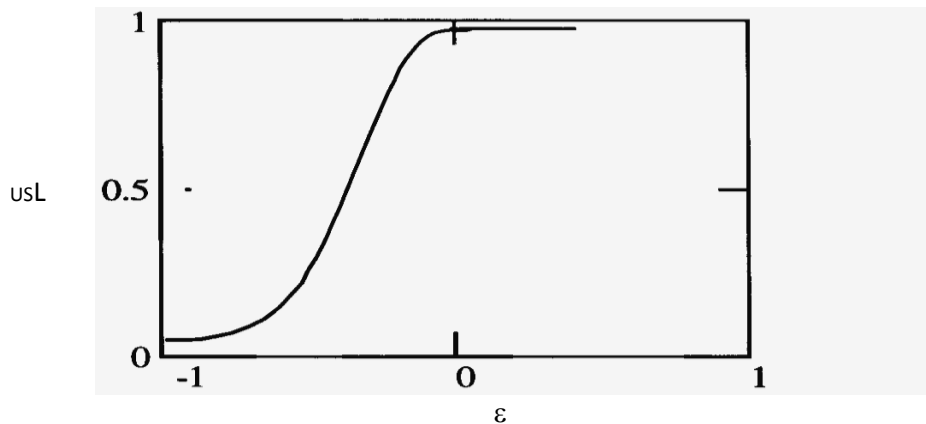
Figure 6.2 illustrates the sensitivity of customers once the actual value of the product attribute deviates from the desired one.

Figure 6.2: Relationship between levels of importance i for customer j, α_{ij} , and the absolute value of distance between actual design and expected value, ε_{ij}



Assessing the Users Satisfaction Level (USL) to the whole product is a function of both deviation of actual from ideal values and importance weighting:

Figure 6.3: Users satisfaction level based on the deviation between actual and design values.



There are many possible applications where a Web based satisfaction analysis program could greatly enhance business opportunities and success. This section discusses different adaptations of the CORE idea for use in a wide spectrum of situations and then defines the market for the chosen industrial case.

- *Post purchase feedback*

Market research and intelligence is big business, proven by the numerous successful companies specialising in this field. Customer feedback is often the basis of future product research whether conducted by the manufacturer or the service providers themselves or the information is bought from an external marketing company. The data collection process may take many forms, and the Internet has provided additional options in recent years. There are now many simple software packages on offer to businesses wishing to use on-line feedback questionnaires. These are simple forms with little or no information processing capacity. This is still a growing market with an ever-increasing need for businesses to adopt effective methods of communicating with their customers in situations where Web-based communication is a suitable solution to reach their market. Opportunities exist for a more intelligent program than those currently on offer, capable of not simply reporting raw data but calculating customer

satisfaction across different sectors of respondents.

- ***Product selection***

Most products we buy are a 'best fit solution' to some extent. Normally, the analysis is left to the customers who will weigh up the competition against their own preferences and make a selection. There are already companies which will offer a product 'best fit' solution based on customer data input, whereby a number of core criteria are identified and required values are compared against a range of available products. This is particularly common in the travel industry, searching for flights or holidays, but could be adapted to other industries and extended to consider less tangible attributes than are currently adhered to.

- ***Bespoke product design***

Every customer is an individual and in the current market climate many companies are offering (and customers demanding) custom design and individual service. This kind of attitude of absolute customer-led flexibility which used to be restricted only to high value B-to-B transactions or premium price special purchases – is becoming more commonplace. There is still considerable additional cost associated with this strategy, primarily due to the labour and communication intensity of the product specification process. If this could be either replaced or facilitated by an on-line questioning tool, it would enable more businesses to move towards bespoke design with a greater customer base due to affordability.

- ***Preliminary order analysis***

It is a common occurrence in many industries that when a customer puts out a large order for tender, companies competing to win the business pour a great deal of resources into compiling a bid, often without completing adequate feasibility analysis. This results in a situation where they either lose the order, unable to best meet the customer demands, or worse, win the order, find themselves unable to deliver and suffer both economic and reputation losses. CORE could be particularly effective in this field, enabling a realistic analysis of the capability to meet customer satisfaction requirements, based on initial rudimentary design assumptions that would avoid wasteful activity. There could be a cut-off policy that any bid that has lower than say, 90% satisfaction outcome is not pursued.

- ***Mass market product design***

For industries where bespoke design will not be a foreseeable reality, such as low value, convenience products, customer satisfaction can be optimised by a pre-design questioning process. CORE provides means of weighting inputs to reflect significance of different individual customers or market sectors; this consolidated data determines the design criteria. In this case, the sampled group would have to be carefully considered to ensure the respondents were representative of the customer base.

There are customer satisfaction surveying products and consultancy services like “primeresponse.com”, “customersat.com” and many more in the WWW. What differentiates CORE application from the current offering are the following features:

1. *Proactive not reactive*

All current surveying services obtain feedback from customers in response to a ready manufactured product or gather information on competitor’s products to give a profile of market situation and opportunities. The possibility of gaining data to be used directly in the design of a conceptual product and be led by that input, rather than seeking reaction to an existing item or service, has yet to be exploited.

2. *More than just a reporting mechanism*

Whilst there are many products available to gather information from customers, they’re largely limited to reporting raw data, at best, converting results into simple graphical form. Using CORE techniques, the information may be transformed into a meaningful design capability analysis and crucial decision-making tool.

3. *Application specific*

The web surveying services at present offer a generic template that may be adapted to individual users in terms of questions asked and some appearance features. The CORE proposal has a much wider scope of applications where it could be of great value, and due to its superior capabilities, requires a higher degree of tailoring to situation needs.

4. Integral part of business process

Although most companies would strive, at least in principle, to make market feedback an on-going part of their business, traditional customer survey techniques do not lend themselves to this and generally will be used sporadically. Introducing communication between customer and designer at the outset of the concept stage and being led by this right through the sales process provides continual information from which emerging market trends will become apparent.

5. Quantifying satisfaction

Current surveying techniques limit determining the level of customer satisfaction to, typically, a scale on which the customer may directly input their level of contentment with the product or service in question. This requires the supplier and customer having the same understanding of satisfaction in order for the results to have any meaning. Even with this assumption, the data will not be adequate for the supplier to be able to identify which attributes must be adjusted by how much in order to improve this rating. So whilst they may serve to provide some information on the company's current performance, there is no constructive detail on which to move forward and make tangible improvements.

2.3 statistica™ – for customer satisfaction evaluation

Levels of Satisfaction in statistica™ is calculated as the relationship between **perception** and **expectation**. The further the distance between what a product or service *is* (**perceived**) to what it *should be* (**expected or desired**) the lower the level of satisfaction toward that product would be.

One could compare calculation of satisfaction to climbing a mountain. Let us assume that the summit of the mountain is the point of maximum satisfaction and the base would be the lowest level of satisfaction. Various positions between the base and the summit represent different levels of satisfaction.

Also the more important the attribute of a product or service is, the steeper the mountain

becomes. Or in other words the climb and fall is more dramatic.

Figure 6.4: Satisfaction calculation and Mountain Climbing



- ***The Model***

The unique mathematical model and algorithm used in statistica™ is called "*Customer Optimisation and Route Evaluation*" (CORE).

CORE measures the level of satisfaction of an attribute based on the difference between the expected and the desired value of an attribute.

Regardless of the nature of product or service CORE needs three specific input to measure how a product or service attribute satisfies expectations. These variables are:

- ***The CORE Importance Level (CIL) of an attribute***

The importance of an attribute determines the degree of sensitivity towards that attribute. The level of importance of a product or service attribute determines the steepness in gain and loss of satisfaction.

For example, when buying a pair of shoes, the size of the shoes would be extremely important in the evaluation of suitability of the product. Even the smallest difference to the

ideal size (i.e. size of the feet) would significantly affect the satisfaction levels towards the attribute "size", thus reducing the overall satisfaction towards the product.

The level of importance controls the trend of gain or loss of satisfaction. In statistica™ levels of importance for each attribute (or question in a questionnaire) is embedded in its model, **therefore, there is no need to set importance levels when setting up questions (see figure 6.2).**

- ***The CORE Desired Value (CDV) of an attribute***

The *CORE Desired Value (CDV)* is the value that the customer(s) expects or assumes to be the ideal value. Also in subject areas where targets are defined and drive quality of service the target value would be the most desired value.

For example, a shoe size 7.5 is the desired value size for a person. Any size below or over size 7.5 will be the reason for dissatisfaction.

Figure 6.5: CORE Desired Value for shoe size 7.5 in statistica

CORE Desired Value	7.5
--------------------	-----

As another example, a value of "**Excellent**", in the range between service attribute values of: "**Poor - Below Average - Average - Good - Excellent**", could be considered as the expected/ideal/target/desired value. These values can then be interpreted within a numerical range between 1-5, as "**Poor**" to be "1" and "**Excellent**" to be "5". Therefore any value below 5 would be source of dissatisfaction.

Figure 6.6: CORE Desired Value for "Excellent" to be equal to numerical value of 5 in statistica™

CORE Desired Value	5.0
--------------------	-----

- ***The CORE Actual Value (CAV) of an attribute***

The *CORE Actual Value (CAV)* is the actual value of an attribute perceived by customer or respondent.

For example, if a customer in a shoe shop is given a size 6.5, 7, 7.5, 8, or 8.5 to try on, one could use the actual shoe sizes (6.5, 7, 7.5, 8, or 8.5) to be the **CAV**. These alternative values could be considered as the possible alternative choices in the designed statistica™ questionnaire.

In a range between **Poor** to **Excellent** the perceived service level by the respondent could be between values 1 - 5.

- **CORE Boundary types and values**

Satisfaction can become saturated. This means that any further effort to improve the quality of product or service may not necessarily increase satisfaction. The unique satisfaction calculation algorithm used in statistica™ captures this phenomenon.

For example, at restaurants or dinner halls normally food portion need to be of a specified quantity. For example the acceptable amount of fish with chips (Fish & Chips being the national food of the UK), should be at least 300gr of fish and 300gr of chips. Anything below the 300gr would be source of dissatisfaction whilst anything beyond 300gr may have little influence on satisfaction. So the **CORE Upper Boundary** could be equal to 300 similar to the desired value.

Figure 6.7: CORE Boundary types and values (Fish & Chips) - upper boundary example in statistica™

CORE Desired Value	<input type="text" value="300.0"/>
CORE Importance	<input type="radio"/> low <input type="radio"/> medium <input checked="" type="radio"/> high
CORE Boundry Type	<input type="radio"/> no boundry <input checked="" type="radio"/> upper boundry <input type="radio"/> lower boundry
CORE Boundry Value	<input type="text" value="300.0"/>

Therefore, if a question is asked as follows the results would look like:

Figure 6.8: Fish & Chips questionnaire in TM

My Fish & Chips Shop

1. How was the portion of the chips in your meal?

- ☐ Too small
- ☐ Relatively small
- ☐ Sufficient size
- ☐ Larger than usual

We have used the numerical value of [too small = 200, relatively small = 250, sufficient size = 300, and larger than usual = 350] each corresponding to the amount of chips in a standard portion. The calculated satisfaction level for response would be: [too small = 0.61, relatively small 0.799, sufficient size = 1.0, and larger than usual = 1.0], although the extra 50 grams of chips in the 350gr chips portion did not increase the satisfaction levels. The customer is already happy with the 300gr portion.

In other cases lower value of an attribute is the desired value. For example, fuel consumption in a car or waiting time to be served in a GP surgery. Although it is desirable not to wait or have a fuel consumption of zero! But in reality constraints in the real world would not allow a threshold to be passed without significant investment or change to the product or service.

The **CORE Lower Boundary** deals with the situations where lower than **CORE Desired Value** does not make any significant improvement to satisfaction. For example patients waiting time at the GP waiting room. People expect or would not mind if the waiting time is around 20 minutes. Therefore anything beyond 20 minutes results in dissatisfaction for this attribute of healthcare provision, but anything less may not necessarily increase satisfaction significantly.

Figure 6.9: CORE Boundary types and values (GP services) - lower boundary example

CORE Desired Value	<input type="text" value="20.0"/>
CORE Importance	<input type="radio"/> low <input checked="" type="radio"/> medium <input type="radio"/> high
CORE Boundry Type	<input type="radio"/> no boundry <input type="radio"/> upper boundry <input checked="" type="radio"/> lower boundry
CORE Boundry Value	<input type="text" value="20.0"/>

Figure 6.10: GP services questionnaire in statistica™

My GP Service

1. How long did you wait before being seen by your GP?

☐ Less than 20 minutes
☐ Around 20 minutes
☐ 20-30 minutes
☐ 30-50 minutes
☐ More than 60 minutes

According to the data in figure 7 and 8, the satisfaction levels for corresponding waiting times are: less than 20 min. = 1.0, around 20 min. = 1.0, 20-30 min. = 0.628, 30-50 min. = 0.417, and more than 60 min. = 0.291. As can be seen for Around 20 minutes or less than 20 minutes the satisfaction value is at its maximum 1.0.

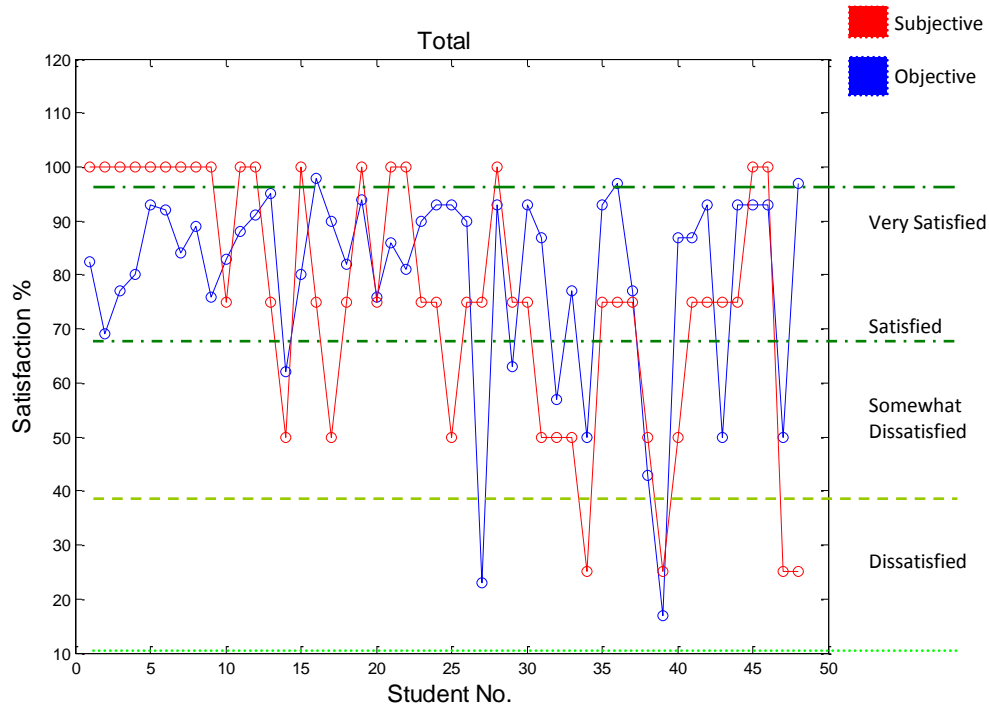
2.4 CORE Validation and Verification test

In order to validate and verify the results of satisfaction values calculated by CORE algorithm, we conducted an empirical study.

50 students were invited to take part in a module evaluation exercise. Students were asked

to respond to questionnaires about their levels of satisfaction towards the lectures.

Figure 6.11: Comparison of Subjective and Objective Module Questionnaire



Looking at Figure 6.11, the graph in red shows the questions that were asked by directly asking how satisfied they were regarding the module (similar to the subjective survey types in figure 6-1), questions were typically in the form of: (*How satisfied students are with one of their module?*).

The options available to select from were (*Very Satisfied, Somewhat Satisfied, Average, Somewhat Dissatisfied, and Dissatisfied*).

The Blue Graph shows results using CORE algorithm without directly asking satisfaction levels from students but measuring satisfaction levels on the same attributes of the module. The

questions as in CORE were in the form of: *What they expect? or How they perceive the service?*

The results confirm that CORE algorithm accurately measures satisfaction (complete correlation), by turning subjective evaluation into a measurable objective calculation.

- This Figure shows a positive correlation between results from subjective and objective questions.
- The results from objective questions (CORE) reflect reality while there is no need for interpretation.

SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *Why is customer satisfaction and product customisation so important for a viable electronic business system?*
2. *Why do you think electronic businesses are in a good position to embed customer requirements and satisfaction into their e-Processes?*
3. *What are the key shortcomings of existing customer satisfaction evaluation methods?*
4. *Explain the CORE model in statistics and the unique features of the model. Do you think it addresses the shortcomings of existing customer satisfaction evaluation methods?*

Chapter 7

E-COMMERCE SECURITY

Ensuring a safe and secure communication passage from the sender to the receiver has been one of the most challenging aspects of communication systems. Hacking into the communication routes and possibly intercepting critical information by an adversary or competitor could decide the outcome of wars, commercial gains, or help the competitor sabotage their rivals' activities. The science of encryption is therefore being constantly improved to eliminate or minimise the possible intrusion into communications systems.

In the Internet era there are individuals who try to hack into restricted information zones, sometimes for curiosity or challenge, sometimes with criminal intent. They may try to sabotage commercial activities, banking systems, defence systems, and even attack databases where secret information on individuals is kept. To combat this there are people and organisations that have to constantly monitor and improve the firewalls to keep intruders away.

Here we will briefly discuss the security of electronic financial and commercial systems rather than other systems. We will especially discuss electronic transactions, identification, authentication, and encryption and decryption in the Internet era.

1. SECURE ELECTRONIC COMMERCE

1.1 Electronic transaction:

One of the advantages of electronic transactions is the elimination of physical money handling. Digital payments do not require the presence of physical money, therefore, transactions occur with speed of light and minimal effort. Physical possession of money no longer provides a general basis for ownership of cash. Hence, companies or individuals are able to engage in trading in the virtual world of e-Commerce. The advantages are that digital information can in effect be in multiple places at once and many activities that used to require manual interference i.e. ordering, billing, and receipt printing have been automated and

conducted in the shortest possible time. However, this qualitative change demands new mechanisms for authenticating the source and destination of payments [Westland 2000].

1.2 Identification of individuals

Usage of unique usernames and passwords has been one of the most effective way of identifying individual users of a specific system or network. Passwords are the most commonly used deterrent to computer crime. Passwords appear in a number of differing contexts: as an entry permit, as a secret key that unlocks an encrypted message, as a signature that identifies the author of a message, and so forth [Westland 2000].

1.3 Privacy

Privacy is security over information that people consider to be uniquely their property [Westland 2000]. The protection of personal privacy has become one of the most controversial issues. The access to personal information regarding individuals in databases held is an important issue and has been the centre of controversies for human rights activists. UK Data Protection Act (1984), is one of the most complete and comprehensive regulations in the information technology era. The act provides individuals with a number of safeguards against abuse of personal information contained in databases. Individuals are able to apply for a copy of all data stored on a computer that relates to them. They can also insist on that information being correct if it is wrong or out of date [Westland 2000].

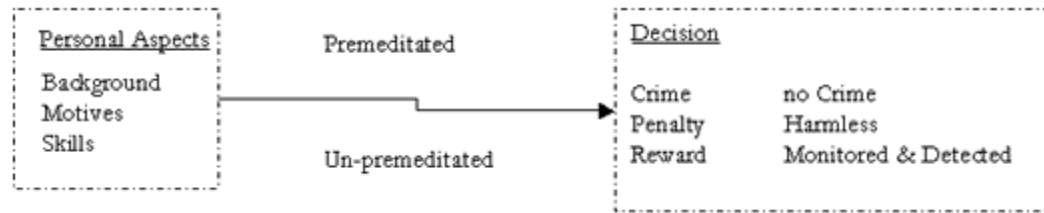
1.4 Controls

Designers of electronic security systems have two strategies to fight Internet-related criminal activities (1) the sequential control (2) the layered control. The selection framework favours a sequential rather than a layered control strategy. A sequential strategy attempts to influence criminal decision making at several points in the sequences leading up to a computer crime [Westland 2000].

The rational check for detecting a network crime is to: At personal level, establish the person's background, motives, skills used to commit crime; determine whether it was premeditated or un-premeditated. On the decision level decide that: The person has committed a crime, therefore he/she should face penalty or may be rewarded; crime was not committed

since it was harmless, well monitored, and detected by the system.

Figure 7.1: Sequential strategy for network crime analysis



2. ENCRYPTION AND PASSWORD CONTROL

Secure electronic commerce and digital payment are made possible by advances in one particular class of controls: encryption and password controls which scramble information assets while they are in transit through networks such as the Internet, making them difficult for criminals to steal or sabotage [Westland 2000]. The variety of transactions protected by encryption is gradually replacing conventional paper mail and Fax; electronic commerce channels have finally been refined and made operational. Unencrypted electronic transactions are relatively easy to intercept and scan for interesting keywords. Even with secure databases, unencrypted transactions to and from databases can leave corporate data open to surveillance, which can be accomplished easily, routinely, automatically, and undetectable on a grand scale. International cablegrams are already scanned this way on a large scale by intelligence organisations, by organised crime, and by drug traffickers. Because of the vulnerability of electronic transactions, encryption has become an important control over networked computer system risk.

The Enigma story illustrates the importance of encryption and decryption:

"The Enigma is a cipher machine that uses rotor-based technology. Many such machines were built by a variety of companies to be used for cryptography for commercial purposes. The German Army used these machines before and during the Second World War to transfer sensitive information along their communication lines.

Figure 7.2: An Enigma Machine, <http://raphael.math.uic.edu/~jeremy>



The function of the rotary system is that each rotor in a rotor cipher machine permutes a letter of the alphabet. The rotors are mechanically connected to each other and if one rotates a position the other will rotate to specific degree, and the rest of the rotors do the same. The “key” to the rotor is the combination of the rotors used plus the initial position of the rotor. In addition Enigma had extra features to further complicate the deciphering i.e. a plugboard and a reflecting rotor. (for further information see <http://raphael.math.uic.edu/~jeremy>)

Breaking the code and deciphering the Enigma code was crucial for the allies. A Cambridge professor called Alan Turing and a big group of his assistants made a fundamental contribution to mathematics with his solution to Hilbert’s decision problem. In the process he invented the first computation machine. This ancestor of modern computers helped allies to decipher German codes and (was) consequently a great contribution to destroy German war machine. Their great achievements in the area of encryption and decryption have inspired many computer and security specialists in designing advanced encrypting and decrypting algorithms.”

The following sections provide a brief overview of encryption controls.

2.1 Single-key crypto systems

The single-key encrypting approach is a one-to-one system. The encryption system follows a

simple set of principles in their design. Assume that I want to send you a message and do not want anyone but you to read it. I “encrypt” or “encipher” the message, scrambling the information content so that it is unreadable to anyone except you, the intended recipient. I supply a “key” or password to encrypt the message, and you have to use the same key to “decipher” or “decrypt” it. This sort of system is called a single key encryption system. Single-key systems are the simplest way to secure messages. They are also the least secure encryption approach [Westland 2000].

The primary weakness in a single-key system is that the key must be transmitted via secure channels so that both parties can know it [Westland 2000].

2.2 Public key cryptosystems and digital signatures

Security can be greatly improved by using public-key cryptosystems. In such systems, the sender and the receiver of a message have two related, complementary keys a publicly revealed key and a private key (which is kept secret). Each key unlocks the code that the other key makes.

Individual’s public and private keys are generated simultaneously using a mathematical algorithm. Messages encrypted with one key (public key) can be decrypted only with one other key (private or secret key). Public keys can be known to anyone. In fact it is best for public keys to be widely disseminated (e.g. via the recipient’s web page). Private keys must be kept as that individual’s own personal secret [Westland 2000].

To transmit a secure message, the sender encrypts his/her message with the public key of the entered recipient. The recipient decrypts that message with his/her own secret key. Indeed, the only key that will decrypt the message will be the private key, which was generated with the public key used to originally encrypt that message. The message uses a mathematical model, possibly random process generator to create the private key. Then only the private key will have the power to encrypt that specific message. The private key is known only by the recipient.

2.3 Key certificates

Keys are kept in individual “key certificates” that include the key owners’ user identification (the person’s username), a time stamp of when the key pair (the public key and its corresponding private key) was generated, and the actual contents of the public key, whereas

private-key certificates contain the corresponding (secret) private key contents [Westland 2000].

2.4 Certifying authorities

Public keys due to the publicity are prone to tampering and misuse. It is therefore necessary to make sure that only certified users are allowed to use the system. With an example we will illustrate how a public key can be abused [Westland 2000].

Imagine you intend to send a private message to receiver A. You retrieve A's public key from an anonymous FTP site. You send your encrypted message developed using A's public key through an Internet e-mail. Undetected by you and A, individual B has intercepted your information and has generated a public key on A's FTP using your information. You may start sending private information to A without realising that you are using the bogus public key created by B rather than A. B can therefore decipher your information since it possesses the private key. Also it would be possible for B to re-encrypt the deciphered message using the public key without anyone suspecting. Furthermore, the intruder can even forge valid signatures from A with this private key because everyone will use the bogus public key to check A's signature.

In order to prevent this sort of fraudulent act, a third trusted party who has got a genuine copy of A's public key may be used. Also this third party will have a good copy of your public key. The third party that we call C will be the intermediary that is specialised in authentication of keys and signature. This trusted source is a *certifying authority*.

A certifying authority is specifically appropriate for large, impersonal, centrally controlled corporate or governmental organisations [Westland 2000]. With growth in digital transactions the certifying authorities are becoming successful services. They provide individuals or organisations with electronic certificates similar to passports or identity cards with unique information. These digital certificates play an important role in verifying people's identity. This has helped facilitate and speed up millions of secure transactions occurring in the Internet every day.

3. AUTOMATIC DISCONNECTION

Another way of controlling transactions is using time limitations or number of trials to enter the network. Normally breaches of security require some time or a number of attempts by the intruder. By allocating a fixed time and number of attempts one can reduce the risk of intruders breaking the security barrier. Once the time or number of legitimate attempts expires the computer automatically disconnects or cancels the transactions or entry permit.

4. FIREWALLS

The security of transactions is a major concern for e-Commerce. Two ways to ensure security is using “electronic certificates”, which allow the Internet users to accurately identify host/client transactions, and “firewalls” which act as guards to restrict access [Westland 2000].

Firewalls act as filters between local networks and the global Internet preventing illegal entry of persons or contents. There are two types of firewalls: Packet-level filters and application-level gateways [Westland 2000]. Packet-level filters control the TCP/IP packets transferred through the network. It checks the network addresses, ports, sender and receiver ensuring that the traffic is authorised. The application-level gateway searches the network frequently by acting as surrogate for all the machines on the network. The network systems’ are normally filtered by packet-level where it is improved and enhanced by application-level [Westland 2000].

5. FILTERS

As the name implies Filters are designed to separate unsolicited electronic information from the solicited ones. Tools and techniques have been developed to tackle the flood of unwanted information to access personal computers and mobile devices. There are number of filters that have become available to users and system developers [Whiteman 2003, Whittaker 2002].

5.1 Black & White Lists

Websites are identified as white list or black list. Black list sites are sites that are considered to be not suitable for view at the receiver side. Pornographic sites, terrorist activity, and information that promote violence are some examples of this type filtering. These type of information and websites are identified and blocked by such filters White lists are the ones that

can pass the filter and be viewed by the receiver.

5.2 Keyword & Text-Bases Analysis

The filter software searches the document for specific words or concepts and blocks the unsuitable content.

5.3 Proxy Dedicated Server

The filtering solution located at remote resources is called proxy filtering. Each time an attempt is made to access a URL, the proxy server will categorise the content and grant the access according to user privileges.

5.4 Dedicated Browser

This approach replaces the usual Internet browsers e.g. Internet Explorer or Netscape with special and customised browser. This browser has its own interface, to direct users towards a selection of harmless information on the WWW.

5.5 Time Limitation

This technique is especially used for chat-room control and Internet usage time. It allocates a limited amount of time for the user to access the electronic information or documents.

5.6 Privacy Control

This method provides the user with username and passwords to receive and view specific information.

5.7 Chat-room and Webpage Activity Monitoring

Activity monitoring is mainly done by experts who monitor chat-room activities and raise alarm once violation occurs. Experts view and browse the contents of websites and make sure the contents are not offensive or dangerous for public. This method is laborious and consumes a large amount of man/hour since most of the control is done manually. Attempts are being made to automate monitoring as much as possible.

5.8 Image Content Analysis:

Image content analysis is mainly designed to filter pornographic and violent images by analysing the images. This is done by a combination of sophisticated mathematical models that conduct pixel analysis and manual interpretation. The objective here is to differ between harmless and harmful image contents.

6. ICT ATTACK CLASSIFICATION

Whiteman et al (2003) describe an ICT attack as “*A deliberate act that exploits ICT vulnerability*”. According to Whiteman et al (2003) some of these attacks are:

- *Malicious Code*: execution of viruses, worms, Trojan horses, Spyware, and specific codes with the intent to sabotage or steal information.
- *Hoaxes*: Masked viruses under seemingly harmless messages and newsletters.
- *Back Door*: Using specific access mechanisms to enter networks and their sources. Mainly exploiting faults in system’s administration setups.
- *Password Crack*: using tricks or algorithms to guess passwords. Normally the attack concentrates on Security Account Manager (SAM) data files.
- *Brute Force*: Password guessing by narrowing down the search to a small number of accounts. This type of attack can be very dangerous for low security systems.
- *Dictionary*: A form of Brute attack again by narrowing down the search to specific accounts and comparing commonly used passwords (dictionary)
- *Denial of Service (DoS) and Distributed Denial of Service (DDoS)*: DoS case, the attacker overwhelms the system by large number of access request causing the system to slow down or crash. DDoS attacks are very difficult to handle since they are coordinated stream of simultaneous access request from different locations (zombies) causing the target system to crash.
- *Spoofing*: The spoofer tries to gain unauthorised access to a computer or network using

an IP address indicating that the IP is a trusted address.

- *TCP hijacking*: the hacker comes between the company and the customer and controls the communication between them. They therefore can take the key information and fool the customer to reveal their information (private key stealing). Also see Encryption and password control section in this chapter.
- *Spam*: Swarming email systems with unsolicited commercial email.
- *Social Engineering*: The attacker grooms and tricks people to reveal sensitive information by pretending they are someone else.
- *Buffer overflow*: Overflow of data sent to a buffer that the system cannot cope with. This results in a mismatch between processing rates and communication rates resulting in collapse.
- *Timing Attack*: Exploits the web browser's cache. It creates malicious cookies stored on client's side. It allows the attacker to collect information from password-protected sites.
- *Attack on Industrial Control Systems*: This is a new type of attack, which at times can be sponsored by states against one another. It is designed to attack industrial control systems in factories, power plants, nuclear installations, refineries, water installations, and other crucial infrastructures. Normally the attack exploits the weaknesses in communication hardware, control and device network, and industrial controllers (e.g. PLC). It causes the system to malfunction and sabotage the normal performance of the machinery and equipment. It could be very dangerous and cause serious injuries or fatality. Some examples are the Stuxnet worm specifically designed to attack a nuclear facility in the Middle East. Such attacks normally occur by installing the worm within the control system of the plant and not necessarily via internet.

SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *Why do you think security is an important factor for a successful electronic business system?*
2. *What is encryption and how does it work? What is single key crypto system? How does a public key work?*
3. *What is Spoofing? How could an industrial control system attack jeopardise normal life? What can be done to minimise it?*

Chapter 8

DESIGN, DEVELOPMENT AND IMPLEMENTATION OF SUCCESSFUL GLOBAL ELECTRONIC BUSINESS SYSTEM

A viable system in its life cycle (see chapter 3 – business life cycle), needs to evolve and adapt. No system will be perfect at its inception. However, by integrating and enhancing the capabilities to monitor its environment and adjust its processes to meet those ever changing demands would be crucial for survival – but above all prosperity. A prosperous and successful business system can therefore be called an *enterprise*.

It would be useful if all decision that effect the design of an enterprise adhered to a consistent vision of how it should operate [Giachetti, R. 2012]. An enterprise architecture that establishes, integrates and enables the electronic processes of an enterprise would be for this purpose. The enterprise architecture enables systems designers to embed the necessary capabilities to achieve strategic objectives of the company. According to Giachetti (2012), “*An Enterprise Architecture describes the **structure** of an enterprise, its decomposition into subsystems, the **relationships** between the subsystems with the **external environment**, the terminology to use, and the guiding **principles** for the design and evolution of an enterprise.*”

1. ENTERPRISE ARCHITECTURE AND STRATEGIC INFORMATION SYSTEMS PLANNING

In this section we will discuss the Enterprise Architecture and how to plan one for a successful business model. Once we describe how to go about setting up the framework for your business model, we will discuss the Strategic Information Systems Planning enables you to assemble the building blocks of your enterprise.

1.1 Enterprise Architecture²¹

A well-received framework for enterprise architecture suggested by Zachman (1987) who worked for IBM is discussed here. The framework draws from multi-disciplines of architecture-construction and engineering-manufacturing principles to establish the context.

The framework describes enterprise in a two dimensional matrix of enterprise *functionings* and *perspectives* [Giachetti, 2012]. The matrix is shown in Table 8.1.

Table 8.1: An interpretation of Zachman's Framework

<i>Functionings</i> <i>Perspectives</i>	Data (What?)	Function (How?)	Network (Where?)	People (Who)	Time (When?)	Motivation (Why?)
Scope (Planners)	Business Data	Business Functions	Locations for business operations	Individuals and Their Roles	Business Events	Enterprise Objectives
Enterprise Model (Owners)	Information and Knowledge Structure	Business Process Model	Business Components & their Interrelationships	Organisation Chart	Strategic Planning and Time Frames	Business Plan
Systems Model (Designers)	Enterprise Resource Model	Functions and Activities	Distributed System Architecture	Job Descriptions and Responsibilities	Business Schedule	Business Rules and Policies
Technology Model (Engineering)	Physical Enterprise Model	Data Flow Diagram	ICT Architecture	The People	Control structure	Reward and Management System
Technology Components (Implementation)	Data Dictionary	Process Specification and Coding	Network & Communication Infrastructure	The People	Timing and sequence of Operations	Supplier Contracts and Performance Measures

The rows in the table:

R1. Scope: The scope sets out the company's strategies, objectives, purpose and boundaries. It provides a roadmap for the design and implementation.

²¹ For more on Enterprise Architecture, theory and methods – I recommend reading Giachetti, R. E. (2012), Chapter 5 and 6.

- R2. Enterprise Model:** Represents the business owner's view of the nature of the business. It outlines the functions, structure, and interfaces from the owner's perspective.
- R3. Systems Model:** Is the interpretation of Scope and Business Model from a subjective overview to objective implementable blueprint. System modelling is the first step to relate high level business aspirations into functional technical modules that can be implemented using the technology.
- R4. Technology Model:** Is the physical model of the business processes. It is the technical interpretation of the Systems Model and includes the functions, information structure, and interfaces.
- R5. Technology Components:** Are the physical hardware and software suite of technologies are integrated to perform the business processes and operations. It also defines the business network and the communication protocols that govern the interrelationships between internal and external partners in the value chain.

The columns of the table:

- C1. Data:** Represents the units of raw information that are gathered, accumulated and processed to model and facilitate business processes within the business model.
- C2. Functions:** Describe how things are done, the interrelationship between the data and how they are put together to create the necessary functionalities of the business model.
- C3. Networks:** Describe the topology of the business functions and their relationships. Within the Enterprise Architecture the networks illustrate "Where in the Enterprise Structure" things are done.
- C4. People:** Are the human resources allocated to specific processes. It is their responsibilities to ensure that the smooth function of the business processes. Their role is vital even in highly automated systems. They ensure sustainability and maintenance of the system to the highest standards.

- C5. Time:** It shows “When” things should be done. Sometimes these times are deterministic, but random events can cause time frames to lapse. Therefore it is important to make sure contingencies are established in any activity so that projects remain in realistic time frames and schedules.
- C6. Motivation:** Presents the “Why” things are done. They include business goals, strategies and aspirations. It helps to focus efforts and provide a vision to employees and stakeholders.

1.2 Strategic Information Systems Planning

The core global electronic commerce (GEC) is based on information and communication technology that seamlessly embeds the electronic processes of the business model. GEC can be complex and risky due to lack of expertise, computing and networking constraints, cultural differences, and security issues. Advanced computing and information technology can be purchased and installed at ever decreasing costs. Research and careful studies need to be carried out to evaluate the risks involved.

Within the auspices of their Enterprise Architecture, companies can gain competitive advantage in global markets provided they:

1. Conduct continuous national and international market research to identify market opportunities. Fast changes in technology and customer needs require robust research strategies to keep the company on top of business.
2. Customer orientation, GECs should utilise latest software technology to ensure maximum customer satisfaction towards products and services. Products and services should become more personalised and user oriented.
3. Focus on relationships by making the presence in the WWW an interface to a wide marketplace rather than concentrating on transactions. It is important to include

features on the web pages that enable the customer to self-manage the relationship.

4. Integrate the end-to-end supply chain.
5. Offer value-added, cost competitive and culturally compatible products and services.
6. Facilitate and focus on online national and international marketing service.
7. Create brand credibility, with a high quality portfolio of products/services.
8. User-friendly websites which are informative and fun to use and easy to navigate.
9. Offer easy ordering procedures, secure transaction and fast delivery services.
10. Identification of risks and anomalies in the system at early stages and taking measures to reduce risks and eradicate anomalies.
11. Use the most productive and advanced computing and networking equipment.
12. Maintain flexibility and agility both in product design and in business operations. For Electronic Business Systems, this should be less laborious.

The most important rule in planning the enterprise's information system that enables your business operations is to give the customer the feeling that you are worth their trust. Customer choice is based on the customer-to-business relationship. The customers should be convinced that the structure and functionality of electronic economy revolves around their needs and requirements. In order for the imperative business customer relationship to bear results the following rules should be observed:

1. Revolve your company's operations around your customer: The way you treat your customer defines the dynamics and the value of the relationship. The technology ensures the speed, scale, security, and integrity of transactions. The business process guarantees the integrity of the relationship and how the company handles customers in the context of relationship building.

2. *Avoid falling into the trap of online price wars:* This will result in increased fixed operating and customer acquisition costs. Today with the speed of “search for best offer” software your best price will be matched and also be beaten in matter of seconds (see Chapter 5).
3. *Build value networks that will consolidate your relationships:* In the world prior to e-enabled systems organisations needed to own nearly all the value chain to maintain control and compete. Thanks to electronics and communication technology small organisations can now quickly assemble a virtual value chain to meet their customers’ ever changing demands. Once prudently put together, managed and controlled this rapid force will offer services/products with better cost savings and flexibility.
4. *Your value network is like a process factory that supports your key relationships:* Out-source and in-source for added capability to your process. Simulate the operations within the value network and use your partners as resources to your production plant.
5. *Design your enterprise with the flexibility to be able to respond to rapid growth or recess:* In an economy where value is normally virtual, the fluctuations of growth and decline are rapid. Unlike physical products where assets are materialised, in the Information Technology era, assets such as information, intellectual property and customer-partner relationship can grow astronomically or become meaningless with the same trend. Dot-com experiences have clearly shown how fast a company emerges as a multimillion-Pound industry and suddenly collapses in a few days. Therefore it is important to design the organisation based on rationale and understanding of e-economy and the socio-economic aspects.
6. *Your experience and customer knowledge provide a reservoir of competitive advantage that grows in value as you apply it [Keen 2000]:* Translate everything you do and know into revenue or market share. In an economy built on information, real value lies in knowledge-based assets such as intellectual property, customer relationships and partnerships [Keen 2000]. These assets once considered to be

intangible can be leveraged for immediate access to global customer base.

7. *With strategic alliances expand your market and reach out to potential customers:*

Virtual alliances open the business up to new customers. Using partners' databases and customer relationships the company can further expand and reach to other potential partners and customers.

2. THE ELECTRONIC-PROCESS (E-PROCESS)

Successful execution rests on process excellence. Quality management, coordination, procurement, inventory management, scheduling, organisation, customer support, operations, logistics, JIT, BPR, finance, and marketing – all these traditional aspects of process excellence remain vital to e-Commerce success. These processes are behind the visible websites that turn a technology into business [Keen 2000].

The losers often have “websites” that are similar to the ones of the winners in terms of design, prices, ease of navigation, speed, and information resources, all the features associated with *.com*. What they lack is ***e-Process***: A strategy for calibrating the website through minute attention to the business processes that create the customer relationship. This strategy is not just simply an online transaction but it transforms the company's operations and economics.

E-Process is primarily a matter of first prioritising, coordinating and then sourcing process, using a combination of:

- Software to convert business activities to electronic format.
- Creation of electronic links to business partners and associates, either to out- task a specific activity or in-source²² a new capability that enhances the relationship.
- Project management, ensure that the tasks are scheduled and resources are sufficiently allocated to deliver the product on time.

²² In-sourcing is the activity to utilise the resources in the enterprise to conduct tasks without resorting to outside help.

- Exception handling, people, workflows, and routines that can make or break consumer-to-business relationship in exceptional situations.

3. UTILISATION OF COMPANY'S CAPABILITY FOR E-COMMERCE

E-Process determines the nature of a company's capabilities for e-commerce. It is a strategy by which a company:

- Prioritises the process capabilities it must invest in, to construct its e-Commerce relationship based on its value network. The value network is enhanced by creating value in customer company relationship service i.e. order fulfilment, shipping, financing, information and access to other products. The company should be a highway of connections to value-added services rather than an isolated website in the ocean of WWW.
- Sourcing and coordinating processes. The challenge is to combine best practices and best economics to offer the best possible service. The more these processes are embedded in software the better, the cheaper, and the faster the service/product will be [Keen 2000].

4. SOURCING E-PROCESS

The major management issues for any business process is how to plan, coordinate and source the various stages involved, whether the company possesses the capability of handling the task in-house or they need to outsource the task. There are distinct options for the company's e-Process value portfolio:

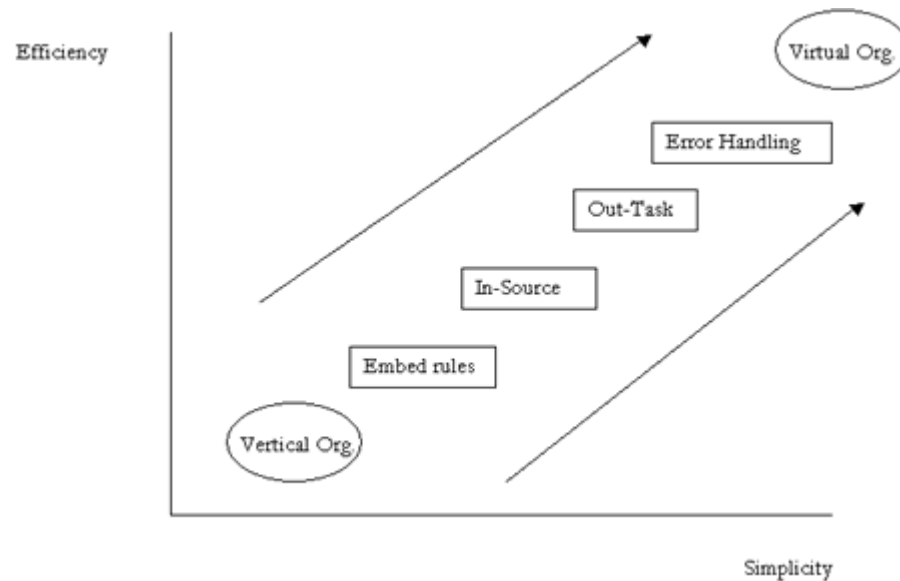
- Embed process rules in the software interface:* Let the software handle the standard routine interactions between customer and the company. By creating customer portfolios as individualised websites the customer can interact with the software with ease (Dell and Cisco Solutions). In the consumer area of e-Commerce (B-to-C) many My... sites such as MyAmazon, MyYahoo, MySAP etc. let the customers handle their own account details. In effect they build a customer service department within the software.
- Out-tasking processes and capabilities electronically:* Electronic link to other sites that

offer tasks that are not possible to be undertaken in the company. For example UPS.com has built a technology infrastructure, enabling customers to link product shipments, services and information throughout the transaction value chain by bringing different players that handle each task in a group. Another example is Gateway's credit checking and financing which is done by eCredit, a company that both assesses credit risk and locates financing. In both cases, UPS and Gateway, out-tasking provides first class service to customers and first class operational capability for the company.

3. Electronic in-sourcing for new capabilities: The company enhances its relationships and brand by providing access to services and products that it brings from the outside to its own interaction with its own customers. Fidelity Investments (Fidelity.com) offers customers financial advice, information, tutorials, discussion groups, and many other value-adding capabilities. These service providers are not necessarily part of the company. They are part of the company's value network.
4. Recovery and error handling: Recovery procedures from malfunctions or if the routine envisaged by the e-Process does not meet customer needs should be in place. It is necessary to make sure a sound response is prepared when things go wrong [Keen 2000].

Old models lack the needed agility and flexibility for competing in the ever-changing markets. BPR was proposed to solve the vertical organisations shortcomings in dealing with new business requirements. Cross-functional activities were also persuaded to minimise the impact of vertical organisation. Out-sourcing also was more and more used to simplify operations and reduce costs [Keen 2000].

Figure 8.1: Vertical organisation vs. virtual organisation, simplicity and efficiency.



5. EFFICIENCY AND SIMPLICITY

e-Process main gain is efficiency and simplicity [Keen 2000]. e-Commerce enabling technology creates a platform for capabilities to be horizontally sourced along the value network. In contrast are vertical companies with their complex and costly sourcing.

With information and linkages being at the fingertips of business modellers, companies can choose the best combination of partners to successfully finalise a task. Out-sourcing reduces company workflow responsibilities that are organisationally complex to coordinate, that tie up capital, and that generate many indirect as well as direct costs [Keen 2000].

6. TARGET RELATIONSHIPS

As value networks form, grow, create brands, and sustain value, the next important factor for successful e-Commerce is the right choice of relationships. The enterprise-to-customer link will generate repeated business. The enterprise-supplier link will ensure best practice order fulfilment, logistics, and quality. Enterprise-to-enterprise links will meet the branding criteria, encompassing a broad set of customer interests and needs [Keen 2000].

Just try to imagine Amazon.com in these terms. Is it a retailer? Is it a wholesaler? A portal? A market maker? An auction house? Well it is nearly all of this.

7. TARGETING THE RIGHT MARKETPLACE

It is important to make sure that the target market has the capacity and capability of accommodating your product. The enterprise needs to fully appreciate the culture, trends, and political structure of any target market prior to entry to that marketplace. Falling short of conducting a comprehensive market research may have dire consequences.

8. UTILISATION OF VALUE NETWORK

B-to-B supply chain management hubs, community-centred sites and portals (gateways) are evidence of the existence of value network in the Internet. They are the representation of the ever-evolving direction of the WWW. Value networks rely on embedding rules, out-tasking, in-sourcing, and in-house processes using the enabling IT technology (see Figure 8.1). These are the tools for value-building. Relationships are value generators. In order to target the marketplace design the relationships first. Leverage your business model not by designing a website, but by looking at the website as a relationship interface [Keen 2000]. Then define the sources to create the most efficient capability that creates the strongest value network. If value network is compromised the website of the company will be nothing more than an advertising outlet or a fashionable entity.

9. E-COMMERCE RELATIONSHIPS

Marketing is not relationship [Keen 2000]. Even if you are a good competitor and offer the best price, and/or use fancy websites to attract customers, and/or invest a lot of effort and money to attract customers. ***What gets them to come back again?*** There are other marketing means to attract customers i.e. TV, radio, placards, etc. Marketing can be part of relationship building but not the relationship itself.

Also a transaction is not a relationship and does not necessarily lead to a sustainable relationship. Unless there is a reason to return, most online companies will fall into the trap of transactions and customer acquisition by reducing price and eventually run on high fixed operating costs leading to disaster (see Chapter 5). These companies must shift to relationship building [Keen 2000].

10. RELATIONSHIPS, PERSONALISING CONTENT

One of the most common and successful methods of relationship building is personalising information. It could be achieved through:

1. *Information content:*

Many data systems designers build databases for knowledge management, data warehousing, and information retrieval wondering why people do not use them [Keen 2000]. They should note that information in itself is not relationship. Information can only become meaningful when it enables communication, coordination, collaboration, community, brand, and decision-making [Keen 2000].

2. *Applied knowledge contributes to relationships Personalised Content vs. Generalised Contents:*

“Content” is a broad term for information that is put to use as applied knowledge [Keen 2000]. Personalised vs. Generalised content is the realm of e-Process. e-Process main objective is to create relationships. Relationships strength increases as content move from general to personal. General knowledge such as stock prices, product catalogues, and news are a commodity with limited relationship potential [Keen 2000]. It may or may not be relevant to you. Personal knowledge includes preferences, product or service configurations, and profiles. It is directly relevant to you. General content is context independent; it is the same for me and for you. Personalised content is obviously completely context dependent, and that is an individual, family, company, or community.

3. *Texture and touch: Creating an environment for relationships:*

The WWW has enabled companies to build the relationships advantages based on two factors of *Texture and Touch* [Keen 2000]. Nature of the information represents its *texture*. The interactive features, its information structure, richness of presentation, originality, and quality of contents create the texture of an Internet business. At the low end a thin and flimsy content of a corporate website is nothing more than an online catalogue. At the high end are the rich contents that bring customers back again and again to the system].

Touch is creating context through dialogue. The level of interaction, exchange,

collaboration and community symbolise the degree of touch. A weak touch (single thread) is where the approach would be *take-it-or-leave-it*. A strong touch (multi thread) and coordination is where products are highly customised and customers are involved in the development of the product (see CODARU)²³.

11. EMBEDDED RULES

Commerce is built on coordination through a relationship interface of exchanging value [Keen 2000]. Internet technology has created a platform to create relationships through websites and automatically coordinate activities. The multimedia features of the website and its interactive facilities for communication between customers and enterprises. Through this corridor customer needs and the enterprise's response are transferred back and forth.

Business interactions and process rules are embedded in real-time software thus automating the whole process. Business interaction rules define the basis for commerce and terms of business coordination within the value network [Keen 2000]. The software enabled sourcing process defines the economics and responsibilities required to meet customer requirements. The rules and logic governing the sourcing process establish type of relationship, business interface, and capability sourcing between partners. Business rules embedded in the software create a direct remote link between customer and the production/service process.

Software may be expensive to develop, however, once developed maintenance and updating is relatively inexpensive. The economic viability of software use is the recurrence aspects. A software algorithm can run hundreds of times with minimal cost. For example imagine a person trying to evaluate and compare products and see how each satisfies his/her requirements. Using software technology and Web-enabled algorithms such activities can be done over and over again without the involvement of any staff. In contrast if a salesperson is allocated to the person like in high street shops, the interaction could be highly time consuming and costly. In addition some customers may find the salesperson over enthusiastic or indifferent in either case it will cause loss of business. A typical example is the cost of handling a simple

²³ **Note:** Also see Chapter 5 of, Keen, P and McDonald, M. (2000), *The e-Process Edge, Creating Customer Value and Business Wealth in the Internet Era*, McGraw-Hill.

banking transaction. The cost of a banking transaction processed by a teller is around 65 pence, 18 pence through a call centre and 0.6 pence if it is done through WWW [Keen 2000].

12. COMPETITIVE EDGE

Each enabling technology re-maps the distance between the enterprise, people and places. It demands that we restructure the processes and activities to remain competitive. Competitive strategy must continuously re-evaluate marketing and supply channels to assure that tasks are assigned to the best possible technology [Westland 2000]. Individuals also should be trained accordingly to ensure functionality and operability of the technology. Any discrepancy in either side will result into loss of business and competitiveness of the enterprise.

SOME REFLECTIVE QUESTIONS FROM THIS CHAPTER

1. *You are commissioned to develop enterprise architecture for easyjet.com as an online shopping business model. Draw a matrix of interrelationship between functions and perspective based on Zachman's framework for this specific business model. Define and describe the components.*
2. *Following from Question 1. What are the key e-Processes for this business model?*
3. *How can Global Electronic Business Systems gain competitive advantage in global markets? (Hint: There are 12 items to list).*
4. *What are the rules for customer relationship to bear results?*
5. *What is meant by "Personalisation" of services and products in a successful global commerce? Explain your answer.*

Chapter 9

CASE STUDIES

The case studies presented in this chapter offer an analytical overview of different businesses that are active in m & e-Commerce. The aim is to offer readers some ideas on:

- how these businesses function,
- the different business models adopted by the companies mentioned to deliver high quality service and products,
- the value chain they have created to develop and maintain high quality services and products,
- and finally, it will leave the readers to reflect on what could be the right business model for target industries that would inevitably go on the WWW.

1. *SECOND LIFE*²⁴

History: Originated in 1991 by Philip Rosedale, the founder of Linden Lab as the Linden World and later renamed to Second Life (SL). Second Life was launched on June 23rd 2003 on 16 servers with around 1,000 users. The website audience grew to a million by 2006, (Rymaszewski, 2007). According to the latest figures this number has reached to 11.5 million users. The world which denotes Second Life was inspired by the cyberpunk literary movement and also by Neal Stephenson's novel "Snow Crash". The main goal of Linden Lab was to devise a world resembling the Metaverse depicted by Stephenson. This was a world where users can interact, play, conduct business and also communicate with others (Wikipedia, 2008). Second Life (SL) is an internet-based 3-D virtual world. Its approach is similar to networking and content provision sites such as YouTube, MySpace or Facebook. The website allows subscribers to:

²⁴ The author would like to acknowledge contributions from B. Patel and M. Moniz for this case study. Web address: <http://secondlife.com>

1. Exchange real currency to “Linden Dollars”, the currency of transactions in this virtual world.
2. Buy “Linden Land” and build things such as entertainment areas, shops, houses, offices, galleries etc.
3. Sell items such as jewellery, land, collectibles, and services.
4. Partake in auctions using eBay technology
5. Create virtual conferences and work environments (offices), colleagues can congregate to view materials, as they appear better visually in SL in oppose to the web (see Fig 1.1 below).

Furthermore, a marketing plan was developed using Second Life by Bovington.s firm in collaboration with the Carat Group, for the Walt Disney film Hitchhiker’s Guide to the Galaxy.. They used SL to create 3D posters, CD-ROM.s and a website, resulting in an overall saving of about \$175,000 on modelling services and travel (Robert, 2006).

Fig 9.1 Example: Andy Powell from Eduserv showing PowerPoint slides Second Life (Reuters, 2007)



Linden Lab makes its profit by receiving a cut from currency exchanges and also by selling

and taxing the real estate in SL (LaGesse, 2007).

Business Model: Content Provision + Electronic Entertainment + E-Mall

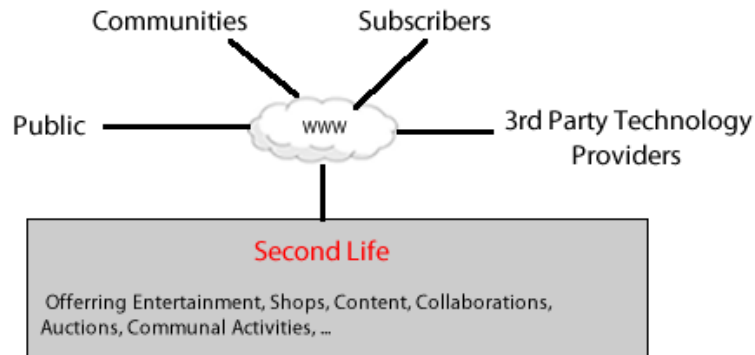
The Second Life business model successfully combines content provision, electronic entertainment and electronic malls. By allowing members to directly connect with one another virtual communities can be created where participants enrich the content in real-time. The simulated environments can be altered therefore allowing members of specified communities to engage in collaborative designs.

Collaborative design becomes possible thanks to the communication technologies i.e. chat, instant messaging, group notices 3D modelling tools, and scripting languages that are provided by the SL environment. To enhance the service further, members are granted IP rights on all in their virtual creations, enabling them to sell and lease them if desired. These combined features largely give way to service customisation and a fit for all service, which widens the potential target audience. This target audience is further extended, by the provision of teens only virtual communities.

Secondly, SL provides the electronic entertainment environment where users can design their own entertainment from role plays, to virtual holidays, tours and activities. Such a feature makes the SL environment an extremely attractive virtual space where people can express themselves and share the virtual world with others.

Thirdly, SL provides its members with a generalised umbrella view, of many of the shops and services available in SL. It creates a virtual market space where shops and services compete or compliment one another's products. Each listing contains a brief description about what they offer, as well as a direct connection to existing e-shops. This umbrella provides a snapshot view of what is available through the community platform. Increased traffic flow and brand reinforcement makes these e-Malls attractive to its shoppers. Members can browse shops and contents leading to increased sales and brand recognition. Furthermore, they can take advantage of the already embedded electronic payment systems, in place within the platform.

Figure 9.2: Second Life Business Model



Summary: The main sources of income for this business model are:

- subscription fees
- lease of server space and the so-called Linden land auctions
- Advertisement fees
- Linden currency exchange

SL adds value to its service by continuously improving user experience through innovation. The business models success has encouraged companies and individuals to invest and extend SL's suite of products. For example, photo sharing tools. These collectively enhance the attractiveness and usability of SL. A mobile application version is being developed which would add a new dimension to SL. Another competitive advantage derived from SL's innovation and popularity, is the level of free advertising received from a number of sources, inclusive of user blogs, fan sites and news reports.

SLs value is additionally enhanced by the customer relation management system i.e. FAQs, web chat facilities, online information and contact numbers.

2. FEDEX²⁵: (LOGISTICS FACILITIES)

History: Over its 25 years old history, Federal Express (FedEx) has built a global transportation network designed to provide the highest level of express service in the industry. The arteries of this network are hundreds of air and ground routes connecting thousands of service centres, with regional hubs located strategically around the globe. Millions of packages flow through this network each day.

Optimising the components of this network to ensure reliability and efficiency is an extremely challenging task. To manage this, FedEx has a long history of applying models and simulations to various aspects of its operations. FedEx has been a pioneer in using the Web to better serve its customers, and it has also played a significant role in helping customers move their businesses online.

Business Model: Value Chain Integrator

FedEx first started to offer Internet services in 1995, namely allowing its customers to obtain the status of their shipments. FedEx's Internet services include:

1. *FedEx InternetShip:* Launched in July 1996, customers can arrange for deliveries through the Web by filling out an electronic air-bill and printing out their own label. In more detail, it provides services such as onscreen preparation of air-shipment documents and printing by the customers, storage of address book at the FedEx server and shipping history information management. By utilising InternetShip, FedEx tries to enhance customer services and save internal costs and customer costs whilst generating additional online sales (e.g. shipments placed online).
2. *FedEx VirtualOrder:* It is an expansion of the previous service mainly targeting and helping businesses to get online. The system enables shippers to set up an online catalogue through which customers can order goods by simply visiting a website, choosing the required items, and paying for them by credit card. But "VirtualOrder" goes one step beyond the static website stage, and connects that same online catalogue

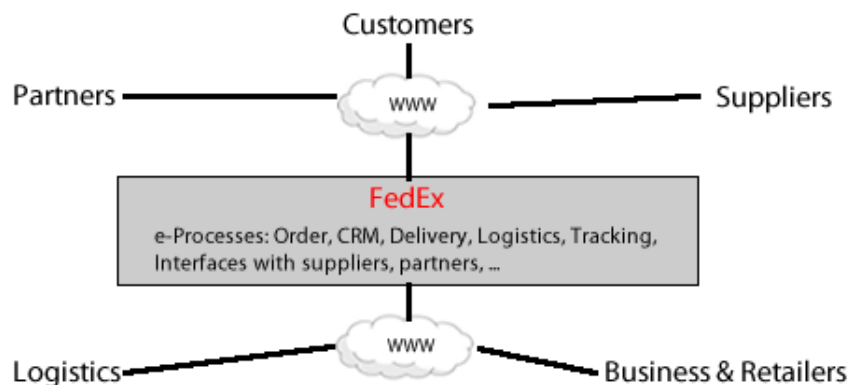
²⁵ Web address: <http://www.fedex.com/>

directly to the FedEx transportation network. That means that as soon as an order is made, FedEx is alerted and the shipping process starts. If all goes according to plan, the integrated carrier delivers the purchase within 48 hours. FedEx has targeted the VirtualOrder system at the Business-to-Business market primarily, although it is also available for business selling to the general public.

3. *FedEx Learning Lab*: Federal Express Corporation has launched an Internet logistics “Learning Lab” designed to teach executives how to use distribution as a competitive advantage in the global marketplace. A significant addition to the company's World Wide Web home page, the FedEx Learning Lab provides on-site tools - such as case studies, white papers and an expert forum - to detail how distribution enables companies to run smarter, better and faster. Executives can use the FedEx Learning Lab as a resource to increase their knowledge about the value of logistics as a strategic weapon. For instance, from the main menu, users can choose to take a “Personalised Learning Experience” or visit the “Expert Forum”.

It becomes apparent that FedEx is not specific about its customers. Any business with a catalogue that wants to go on the Internet is addressed. The only requirement is that the business will ship with FedEx.

Figure 9.3: FedEx Business Model



Summary: FedEx has changed the air delivery service industry. Prior to FedEx's entry, air delivery firms would use the scheduled airlines to move packages from point A to B. They were dependent on the airlines' schedules as well as their on-time records. Even back in the mid-

1970s, airlines had delays and cancellation problems not as severe as in 2000, but enough to cause serious reliability problems for air service companies. The typical on-time delivery service was 43 percent. This obviously led to enormous customer dissatisfaction and low retention rates. Customers were constantly changing their airfreight delivery company. FedEx recognised this problem and decided to change the structure of how freight was handled. They developed a marketing mix strategy, unique to the industry, which focused on distribution. They introduced the idea of a central hub (Memphis) to which all packages came and were then routed to their final destinations. In addition, their entry into Internet Business-to-Business electronic commerce also allowed FedEx to “leverage its global brand name while enabling locally relevant activities”. Its Internet business model is focused on being the best in providing online use of fast and worldwide shipping of packages. By providing services such as InternetShip and VirtualOrder, FedEx managed to successfully offer Internet access to its global logistics services. Just as significant, they also purchased their own fleet of planes, which eliminated the dependency on the scheduled airlines. The company flew its planes at night, which meant airport delays were minimal. The strategy allowed the company to create its now famous slogan: "When it absolutely, positively has to be there overnight." FedEx's retention rate became significantly higher than the industry average (percentages in the 90s versus 43 percent), and in time they became the market leader.

3. AMAZON.COM²⁶

Company Profile: Amazon.com is the pioneering bookstore on the Internet that was first opened in July 1995 by Jeff Bezos. The firm offers online shopping services and partnership opportunities such as online search for books, music and video items. The products they sell include an array of audio, video and book titles. Amazon has one of the widest selections and employs international shipping to virtually every corner of the globe in just a few days.

Amazon's focus is having the biggest selection of free-electronic greeting cards, online auction and millions of books, CDs, videos, DVDs, toys and electronics devices. They have expanded to different areas of the world, such as Amazon.co.uk in the UK and Amazon.de in Germany, to service consumers outside of the United States. They aim at being a cost leader in

²⁶ web address: <http://www.amazon.co.uk/>

which their firm has lower costs than the competitors. The deployment of different Amazon branches in different parts of the world allows Amazon to ship its products at a lower price from each point of shipment to the consumer.

In recent years, Amazon.com has expanded from being just an online bookstore to an all-around online shopping experience. They have coined the tag line "Earth's biggest selection". Amazon has diversified into different websites. These include movie database, Live bidding sites (amazon.livebid.com), online retail and information about health (drugstore.com), online sporting goods (gear.com), online grocery shopping and delivery (homegrocer.com), largest online pet shop (pets.com), online luxury and premium shopping (ashford.com), and online retailer of hand crafted products (eZiba.com).

Business Model: The online bookstore industry that Amazon.com has pioneered was at first very difficult to navigate and follow. There were different barriers such as distributing capabilities and variety of selection offered making the site complicated for the customers. Amazon successfully solved the tricky parameters as being the first one to get into the whole idea of online retail. With being the first, they had the luxury to set what became the norms for the industry. Factors that may lower these barrier tactics would be a wider selection and the ability to go to an actual bookstore to exchange or return books or other products. This network of "actual" retail spaces makes it easier for the consumer to return or exchange the products they were not satisfied with. These handicaps of Amazon were the basis for the emergence of book retail giants Barnes and Noble and Borders in the online shopping industry.

In the earlier days Amazon had negative income, with the rise of e-Commerce and being the pioneers led to the success of recent years. Their growth period was during 1994 to 1995 when they were the first of its kind in the world. They incurred very high costs in terms of distributions. Still with a negative income, Amazon went public in 1997. With investors banking on future positive cash flow for this company, Amazon's market value soared. Many people caught on with the idea of online shopping, thus, Amazon's success. Amazon's success as an online retailer prompted bricks-and-mortar rivals Barnes and Noble and Borders to join in.

Amazon's products are marketed for a large number of potential consumers. Books, audio, video and electronics are appreciated by a majority of the population especially those who have

access to the Internet. Amazon's strength internationally lies within its networks in major ports and cities around the Globe. Amazon first started out in Seattle but as soon as they had established a niche market, they opened shops all over the nation and in cities such as London, Berlin, The Hague, Paris, Tokyo, Singapore and many more. These branches overseas improve their delivery service to a wide consumer base.

The target market for online retail constitutes a large population. They are people who have had some form of higher education and have access to the Internet and computers. The segment of online shoppers has increased dramatically in recent years due to the convenience of shopping in the comforts of the homes and the accessibility of the Internet. Consumers also tend to compare prices among the retail leaders such that buyers are able to buy products with very big discounts compared to ones bought in "real" retail outlets. The bargaining power of the consumer is based on the competitive strategies of each active firm in the industry. Thus, consumers can challenge one firm for charging more than the other one such that the firm will beat the price of the competing firm.

Amazon's supply chain includes bookstores, publishers, media houses, and electronics manufacturers.

Summary: Amazon's primary value chain includes purchasing/sourcing, marketing, distribution and after-sales services which include returns and exchanges from unsatisfied customers. Their main focus is in the purchasing/sourcing and in the distribution of the products to the consumers. Their investments are therefore concentrated on warehouses in key points of high consumer demand areas and an efficient delivery and distributing system to service all its consumers. Thus, Amazon controls most of its distributing system that spans across borders.

Amazon.com has remained on top of the online retailing business despite the entrance of giants such as Barnes and Nobles²⁷ and Borders²⁸. Their success is attributed to two factors; timing and continuing to invest heavily into the inventory and distribution systems. Amazon, by

²⁷ web address: <http://www.barnesandnoble.com/>

²⁸ web address: <http://www.bordersstores.com/>

being the first of its kind, has a big lead over the nearest competitors due to their experience and its reputation. Their focus remains on improving efficient delivery systems across borders and to build name recognition as the number one retailing firm in the Internet. They have also ventured into different retail options to keep that lead. Marketing, Innovative inventory and distribution systems, and name recall have helped Amazon build a sustainable competitive advantage.

However, the online retailing business has a very quick cyclical growth. Amazon being one of the firsts to venture in this type of commerce is already experiencing decline in sales. The customers are finding other companies who offer similar services. Amazon therefore needs to improve its customer relationships if it wants to survive in this volatile economy. One of the solutions that Amazon is currently pursuing to improve customer relationship is by offering more diverse online products and services.

Figure 9.4: Amazon.com Business Model



4. DELL COMPUTERS²⁹

Company Profile: The Internet is changing the transactional paradigms under which Businesses-to-Business marketers operate. Business-to-Business marketers that take advantage of the operational efficiencies and effectiveness of Internet transactions are outperforming firms that still operate on traditional transactional processes. As an example, Dell computers, by utilising e-enabled Business-to-Business processes that take place on the Internet, has gained the largest market share in the PC business compared to traditional manufacturers such as Compaq.

Michael S. Dell founded the company in 1994 with \$1000 and a unique idea in the personal computer industry: bypass the middleman and sell custom-built PCs directly to the end-user. Using this approach Dell Computer Corporation has established itself as one of the top two vendors of personal computers worldwide. Its corporate customers include most of the companies on the Fortune 500 list of America's largest companies.

Currently Dell, a direct computer systems company, is the market leader in the PC business. As a matter of fact, ten thousand dollars invested in Dell stock in January 1991 is worth more than two million dollars today. Needless to say, the company has devised a logical method for offering their computers to their consumers to the extent that they have been able to surpass other well-known PC manufacturers such as Compaq and IBM.

Business Model: In the past, computer manufacturers assembled computers based on their inventory of parts. This necessitated maintaining a stock room with three to four months of computer parts inventory in the distribution channel. The new approach taken by Dell is to produce computers only when a customer puts an order through and pays for the item (assemble to order). In essence, customers' funds are used to finance the transaction and this saves Dell millions of dollars in costs. The direct sell method is advantageous for Dell because the company maintains a two day worth of inventory and this helps to save several million dollars in inventory holding costs.

²⁹ Web address: <http://www.dell.com/>

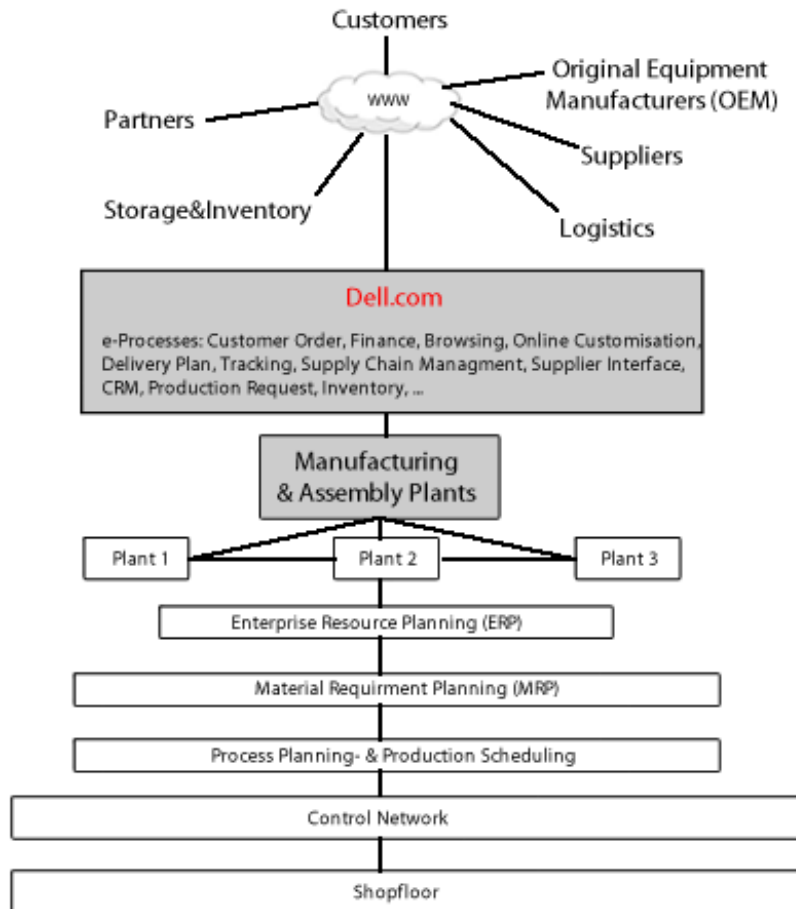
Traditional computer manufacturers face two very important drawbacks: component cost and technology changes. Computer component costs are steadily decreasing so it is not beneficial for a computer manufacturer to keep volumes of inventory in stock over a long period of time. For example, if you buy a Compaq computer from a store, it may have been assembled with components that were in stock for three or more months. More than likely the Compaq computer will cost more than a Dell computer because its components were bought at their market price three months ago, whereas a Dell computer will cost less because its components will be bought at their current market price.

Computer technology has been undergoing significant technological changes. Since many computer manufacturers maintain three to four months of inventory, they have to wait three to four months to bring new models to market. Manufacturers are also forced to mark down prices to sell older computer models. Dell on the other hand, can introduce a new model within a day or two and will not face losses like other computer manufacturers due to obsolescence.

Dell has created “Virtual Integration” with both their upstream partners (component suppliers) and their downstream partners/customers (large companies for the most part) so that the entire supply chain acts like a single integrated company.

Dell builds computers to order. A customer, typically someone who works for a large company like Boeing, goes to a private web page available only to Boeing employees, and can order and configure a computer online. Dell’s suppliers maintain a two-week supply of components near Dell factories. This inventory belongs to the supplier, not Dell. Dell shares information with suppliers on inventory levels, sell-through (rate of product movement through a node), and forecasts. They maintain long-term relationships with key suppliers for design collaboration.

Figure 9.5: Dells Electronic Business Model (also see chapter 3 Global Manufacturing System)



Summary: Dell's business model has significantly been enhanced by customers' ability to interact directly with Dell through its user friendly and simple to navigate website. Other computer manufacturers including Gateway and Compaq are studying Dell's business model to develop similar models for their business. General Motors has been testing a model similar to that of Dell to sell cars in Taiwan. McDonald's has already revamped their stores to produce food according to customers' orders. Ford and Toyota are organizing their operations to customize cars according to customer specifications; and furniture, auto, appliance and other manufacturers are likely to copy Dell's business model in coming years.

Tailoring their computers to their customers' specifications and selling the item directly to their customers is what makes Dell's business model superior. Customers are more than willing

to support a company that offers them flexibility and convenience. No longer is the customer locked into strictly buying their computer from a retailer who can only offer them the “one size fits all” item. Going online makes it possible for the customer to get what they desire and need.

5. EBAY.COM³⁰

Company Profile: eBay is the world's largest personal online auctions site and trading community. eBay created a new market of efficient one-to-one trading by adopting e-Auction business model on the WWW. The idea of eBay was initially developed as a result of a conversation between Pierre Omidyar and his wife, an avid Pez collector. She commented to Pierre how great it would be if she were able to collect Pez dispensers and interact with other collectors over the Internet. As an early Internet enthusiast, Pierre knew that people needed a central location to buy and sell unique items and to meet other users with similar interests. He started eBay to fulfil this need. Pierre launched eBay in September 1995. Since that time eBay has expanded into other markets, including eBay Canada, UK, Germany and other countries throughout the world. It was from the start meant to be a marketplace for the sale of goods and services for individuals.

Business Model: In 1998, Pierre and his cofounder Jeff Skoll invited Meg Whitman to sustain the success. Meg Whitman had studied at the Harvard Business School and had learned the importance of branding at companies such as Hasbro. She called in her senior staff from companies such as PepsiCo and Disney, created an experienced management team with an average of 20 years of business experience and built a strong vision for the company. The philosophy of the cofounders was that eBay would be a company that creates communities by connecting people to each other rather than selling them things.

They quickly shed the image of only auctioning collectibles and moved into a dimension of upscale markets where the average sale price (ASP) was higher. ASP is a key metric in determining eBay's transaction fees, so increasing the ASP became an important item. By forging partnerships with name brands such as GM, Disney and Sun, eBay has managed to do

³⁰ Web address: <http://www.ebay.com>

exactly that. Sun has sold \$10 million worth of equipment and it now lists between 20 and 150 items per day.

eBay has built an online person-to-person trading community on the Internet, using the World Wide Web. Buyers and sellers are brought together in a manner where sellers are permitted to list items for sale, buyers to bid on items of interest and all eBay users to browse through listed items in a fully automated way. The items are arranged by topics, where each type of auction has its own category.

eBay has both streamlined and globalised traditional person-to-person trading, which has traditionally been conducted through such forms as garage sales, collectibles shows, flea markets thanks to their web interface. This facilitates easy exploration for buyers and enables the sellers to immediately list an item for sale within minutes of registering.

Browsing and bidding at auctions is free of charge, but sellers are charged two kinds of charges:

- When an item is listed on eBay a non-refundable "Insertion Fee" is charged, which ranges between 30 cents to \$3.30, depending on the seller's opening bid on the item.
- A fee is charged for "additional listing options" to promote the item, such as highlighted or bold listing.
- A "Final Value" (final sale price) fee is charged at the end of the seller's auction. This fee generally ranges from 1.25% to 5% of the final sale price.

eBay notifies the buyer and seller via e-mail at the end of the auction if a bid exceeds the seller's minimum price, and the seller and buyer finish the transaction independently of eBay. The binding contract of the auction is between the winning bidder and the seller only.

Figure 9.6: eBay.com business model



Summary: According to eBay, during 2002 the company saw 52% year-over-year transaction revenue growth in the United States and 163% year-over-year transaction growth internationally. In the third quarter of 2002 alone net revenues increased 49% over the \$194.4 million generated in the same period a year ago. During the same period, eBay hosted a record 160 million listings during the quarter, representing a 47% year-over-year increase from the 109 million reported a year ago. Nearly 37,000 sellers on eBay.com and 14,000 sellers internationally are now operating storefronts on eBay Stores and eBay Motors alone is a \$3.8 billion business on an annual basis. eBay.com is continuing to be successful to date, and the credit goes to its e-Processes and Customer Satisfaction rates.

6. DOCOMO³¹

Company Profile: In 1957, Kouji Ohboshi, a law school graduate, started his business career at Nippon Telegraph and Telephone (NTT). After spending many years in middle management, he was appointed in 1984 as associate vice president of NTT's Chugoku Telecommunications Bureau. In late 1980's NTT came under enormous pressure from American politicians to break up its monopoly in telecommunication of Japan. Desperate for a less drastic solution, the telephone giant decided to spin off its emerging mobile communications division. Eventually, Ohboshi accepted the job as the first CEO of NTT Mobile Communications Network, the company that would later be known as DoCoMo.

³¹ Web address: <http://www.nttdocomo.co.jp/english/>

During 1992 and 1994, DoCoMo faced its first major crisis: a dramatic slump in cellular phone sales, following the burst of the Japanese economy bubble. With a determination to keep the company's customer base growth, in February 1999, DoCoMo launched a new product, "i-mode", a system that turns the cell phone into a personal network connection, giving subscribers information exactly when and where they want it, while providing businesses a direct channel to consumers at the precise point of potential purchase.

In Japan, DoCoMo has been hailed as one of the fastest growing businesses to emerge in the last decade of the 20th century. The company reported a consolidated operating income of \$7.3 billion for the financial year to March 2001, second only to Toyota. Since 1992 when DoCoMo was spun off from its parent NTT as an independent mobile communications entity, it has been contributing to the continuous growth of mobile phone market in Japan.

Business Model: Data communications over mobile phones has contributed to major progress in the feasibility and availability of mobile computing. Internet access technology implemented over mobile phones such as DoCoMo's i-mode has caused today's mobile phones to evolve from portable phones to information terminals. Japan reportedly outperforms the US and European countries in the use of mobile Internet technology by two to three years.

The business model for a successful i-mode service was designed to expand the number of users as well as enhance the content provided by information providers. It therefore urgently needed positive feedback of the elements through which information providers would continuously provide useful content to users of i-mode compliant mobile phones.

One of the tasks aimed at implementing this business model was to develop easy-to-use i-mode-compliant mobile phones and to develop the network system (i-mode servers and other hardware) that would deliver the content. The second task was a software-based effort to obtain information providers with content that would attract customers.

To address these two requirements and implement the new service, it was essential to integrate the knowledge and competence from a variety of sources:

- the new concepts and viewpoints at DoCoMo,

- the years of experience within existing DoCoMo organisations,
- the intellectual assets inherent within the information providers that were customers of DoCoMo, and
- the intellectual assets of the terminal manufacturers and platform vendors who were partners of DoCoMo.

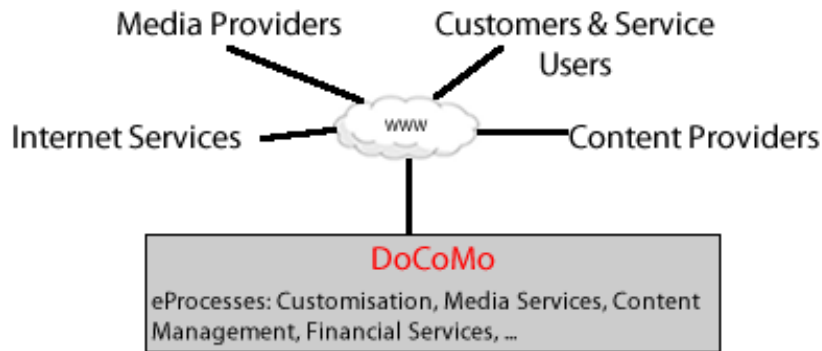
The integrated knowledge and competence would thus become important elements capable of building a new business model for i-mode service.

The i-mode service started in February 1999. However, after the launch, taking a number of measures seemed necessary in order to trigger an explosive growth of the i-mode service:

- The first was to enhance the “portal strategy” which was promoted by the Portal Community in order to generate useful content for the i-mode service.
- The second measure was to incorporate the “terminal strategy” promoted by the Technical Community with the aim of developing new i-mode mobile phone terminals including add-on features.
- The third measure was to utilise platform strategy promoted by the Platform Community to break the ground for i-mode users using platforms for other than mobile terminals.

The key factor in DoCoMo's multimedia strategy is to establish the mobile Internet through the i-mode service. The key to success is business innovation through the creation of a wide variety of strategic communities. This can be achieved by creating strategic communities that achieve empathy and harmony of values among all leaders (the community leaders forming the core of the strategic partnership-based community) of community's constituent organisations.

Figure 9.7: DoCoMo i-mode Business Model



Summary: The number of i-mode end-users across the country topped 30 million subscribers on 4 March 2002 (almost the same number of customers as AOL's customer base but in only one-fifth of the time), and the number of information providers that provide content for DoCoMo's i-mode format menu increased to 828, about 12 times more than the number that were originally present at the launch of the service in February 1999. The number of formal i-mode menu sites provided by these information providers increased to about 1,480, and the number of general sites represented by information providers without a direct content service agreement with DoCoMo (spontaneous sites other than formal i-mode menu sites) increased to about 40,053.

Following DoCoMo's i-Mode success, western mobile operators followed DoCoMo's example and start to offer same services. In March 2002 German mobile operator E-Plus offered i-Mode service in Germany³². Soon after, AT&T Wireless rolled out mMode³³, based upon DoCoMo's i-Mode technology and KPN Mobile offered i-mode service in the Netherlands. In the same year, DoCoMo and French mobile operator Bouygues Telecom S.A. announced i-mode would be available in France by 2003.

³² Refer to <http://www.w2forum.com/news/w2fnews11581.html> for further information.

³³ Refer to <http://www.attws.com/mmode/> for further information

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