UNIT I

Q1. Explain Information Technology (IT)?

Ans. IT is a Collection of computing systems used by an organization. It has become the major facilitator of business activities. It is a catalyst of fundamental changes in the strategic structure, operations and management of organizations. It is creating a transformation in the way business in conducted, facilitating a transition to digital organizations and digital economy. It have been enhancing business competitiveness and creating strategic advantage on their own or in conjunction with EC applications

Capabilities of IT:

1. Perform high-speed, high-volume, numerical computations.
2. Provide fast, accurate, reliable and inexpensive communication within and between organizations, any time, any place.
3. Store huge amounts of information in an easy-to-access, yet small space.
4. Allow quick and inexpensive access to vast amounts of information worldwide at any time.
5. Enable collaboration anywhere, any time.
6. Increase the effectiveness and efficiency of people working in groups in one place or in several locations.
7. Facilitate work in hazardous environments.
8. Automate manually done tasks.
9. Facilitate global trade.
10. Enable automation of routine decision making and facilitate complex decision making.
11. Can be wireless, thus supporting applications anywhere.

Rydhima Chopra

These capabilities support the following 5 business objectives:

1. Improving productivity
2. Reducing costs
3. Improving decision making
4. Enhancing customer relationships
5. Developing new strategic applications

Q2. What are the business values of IT?

Ans. <u>Business value</u>: In management, it is a term that includes all forms of value that determine the health and well-being of the firm in the long run. **It** Expands concept of value of the firm beyond economic value (also known as economic profit, economic value added, and shareholder value) to include other forms of value such as customer value, supplier value, channel partner value. Many of these forms of value are not directly measured in monetary terms. **It o**ften embraces intangible assets. Eg, A firm's business model. The balanced scorecard methodology is one of the most popular methods for measuring and managing business value. An increase or decline in Business Value that an action produces is traditionally measured in terms of Customer Satisfaction, Revenue Growth, Profitability, Market Share and Marketing Campaign Response Rates.

<u>Business value of IT:</u> Various factors affect the business value impact of IT. The most important factor is the alignment between IT and business processes, organization's structure, and strategy. At the highest levels, this alignment is achieved through proper integration of enterprise architecture, process design and organization design and performance metrics. At the level of computing and communications infrastructure, the following performance factors constrain and partially determine IT capabilities:

- Usability
- Functionality

Rohina Chopra

- ❖ Availability
- ❖ Reliability, recoverability
- ❖ Performance (throughput, response time, predictability, capacity, etc.)
- ❖ Security
- ❖ Agility

The term value-driven design was devised to describe the approach to planning business change (especially systems) based on the incremental improvements to business value - this is seen clearly in agile software development, where the goals of each iteration of product delivery are prioritized on what delivers highest business value drives.

Q3. Explain the role of computers in modern business?

Ans.

- ❑ Can save business's money through making employees more efficient and providing tools that without a computer would cost too much.
- ❑ For communications across a number of people, such as between employees, between the business and its customers, between a business and its suppliers. One major advantage of computer communication is that it is often asynchronous, which means that communication can happen even if one person is not available by telephone.
- ❑ Can store huge amounts of data that, if printed, would take rooms and rooms full of file cabinets.
- ❑ Easy to find particular data or to pull two data sets together using a computer; this would consume a lot of time with paper records in a file cabinet.

Rohma Chopra

- ❑ Employees who use computers can get more work done than their non-computer-using peers because communication is easier to accomplish, finding and using information is easier.
- ❑ Ability to do things easily that would have been difficult in the past. For example, in the past, if a company wanted to produce a video, it would have had to rent or buy large video cameras and the equipment to process video. Digital video and the software to edit videos are much less expensive.
- ❑ Allow business employees to analyze huge data sets and to find out new information that can help with business decisions.

Q4. What do you mean by "Doing business in digital economy"?

Ans. <u>DIGITAL ECONOMY</u>: it refers to an economy that is based on digital technologies. Conducting business in the digital economy means using web-based systems on the internet and other electronic networks to do transactions electronically. It is sometimes called the Internet Economy, the New Economy or the Web Economy.

<u>Major IT Characteristics in the Digital Economy:</u>

1. Globalization (communication, collaboration, global marketplaces, customers, suppliers and partners)
2. Digital systems (conversion of analog systems to digital ones. Eg, Telephones)
3. Speed because of digitized documents, products and services
4. The amount of information generated is accelerating and intelligent search tools can help users find what they need
5. Markets are moving online
6. Digitization (music, books, pictures and movies)

Rydhima Chopra

7. New and improved business models and processes
8. Digital and Internet based innovations
9. High rate of obsolescence
10. Opportunities
11. Fraud (criminals employ a slew of innovative schemes on the Internet)
12. Cyber wars (actions by a nation-state to penetrate another nation's computers or networks for the purposes of causing damage or disruption)
13. Digital Organizations

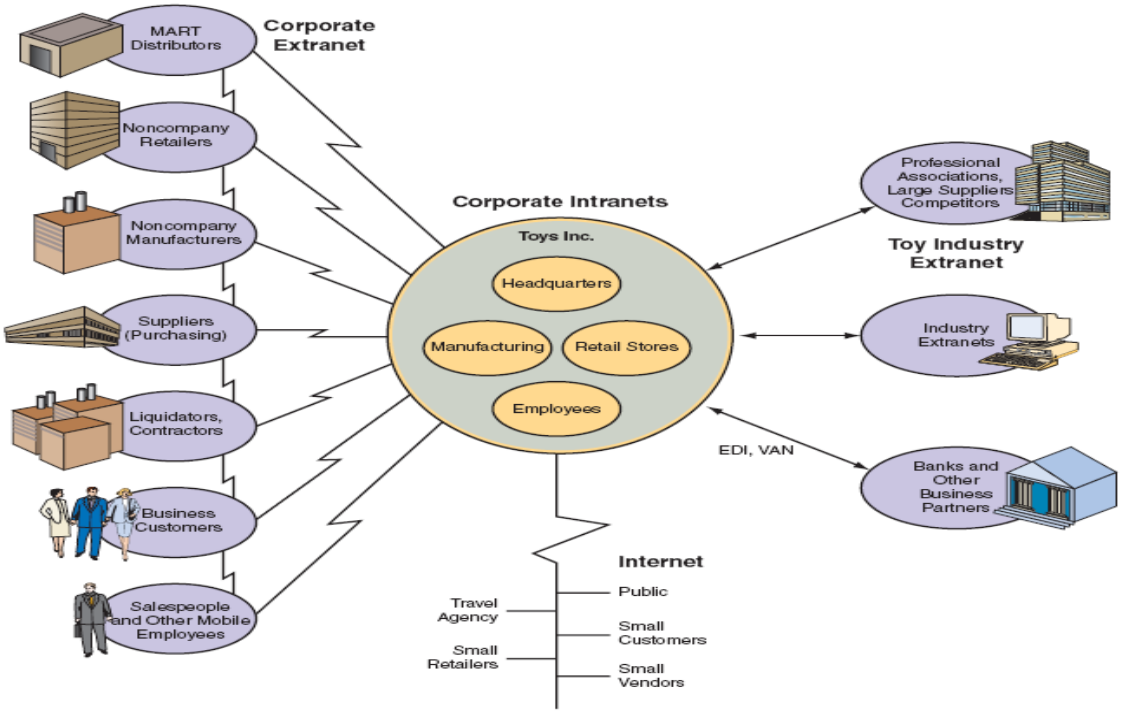
DIGITAL ENTERPRISE(ORGANIZATION): It refers to an organization which uses computers and Information System to perform all or most of its digitizable activities in order to enhance its operations and competitiveness. A new business model that uses IT in a fundamental way to accomplish one or more of 3 basic objectives:

1. Reach and engage customers more effectively
2. Boost employee productivity
3. Improve operating efficiency

It orchestrates the services and workflows that define the business and ultimately deliver value to customers and end users. The infrastructure for digital organizations and EC is Networked Computing (Distributed Computing), which connects computers and other electronic devices via telecommunication networks. Such connections allow users to access information stored and to communicate and collaborate with others. It embraces a fundamentally different approach which requires a modular, interoperable, cross-architecture environment that extends from the farthest edge of the network- employees, partners and customers are located around the world- to the corporate data center and back again (multiple-location networked computers). It uses networks of computers to electronically connect:

Rydhima Chopra

1. All its internal parts via an Intranet
2. All its business partners via the Internet, or via a secured Internet, called an Extranet, or via value-added private communication lines.



<u>OPPORTINITIES FOR ENTREPRENEURS</u>: Digital Economy is providing opportunities for thousands of entrepreneurs, some of them in their teens, to create startup (or dot com) companies and to apply EC business models to many business areas globally which not only sell products but also online services. Also provided are support services to EC and digital companies ranging from computer security to electronic payments. For eg, Google.

<u>BUSINESS MODEL</u>: It is a method of doing business by which a company can generate revenue to sustain itself. It spells out how the company creates or adds value in terms of the goods and/or services the company produces in the course of its operations.

- **<u>SIMPLE MODEL:</u>** A typical company strategy which makes and sells items and generate profit from those sales.

- **COMPLEX MODEL:**

a) A TV station provides free broadcasting. Its survival depends on a complex model involving factors such as advertisers and content providers.

b) Internet portals, such as Yahoo

It includes a value proposition which is an analysis of the benefits of using the specific model.

ELEMENTS OF A BUSINESS MODEL:

1. A description of all products and services the business will offer.
2. A description of the business process required to make and deliver the products and services.
3. A description of the customer to be served.
4. A list of the resources required and the identification of which ones are available, which will be developed in-house and which will need to be acquired.
5. A description of the organization's supply chain, including suppliers and other business partners.
6. A description of the revenues expected (revenue model), anticipated costs, sources of financing and estimated profitability.

UNIT II

Q5. What is Information System (IS)?

Ans. It collects, stores, processes, analyzes and disseminates information for a specific purpose. The composition is usually the same: each contains hardware, software, data, procedures and people or; one or more smaller ISs (typically of larger companies. For eg, FedEx's corporate IS contains applications). It is usually connected by means of electronic networks which can be wire line and/or wireless. It can connect an entire organization, or even multiple organizations. It

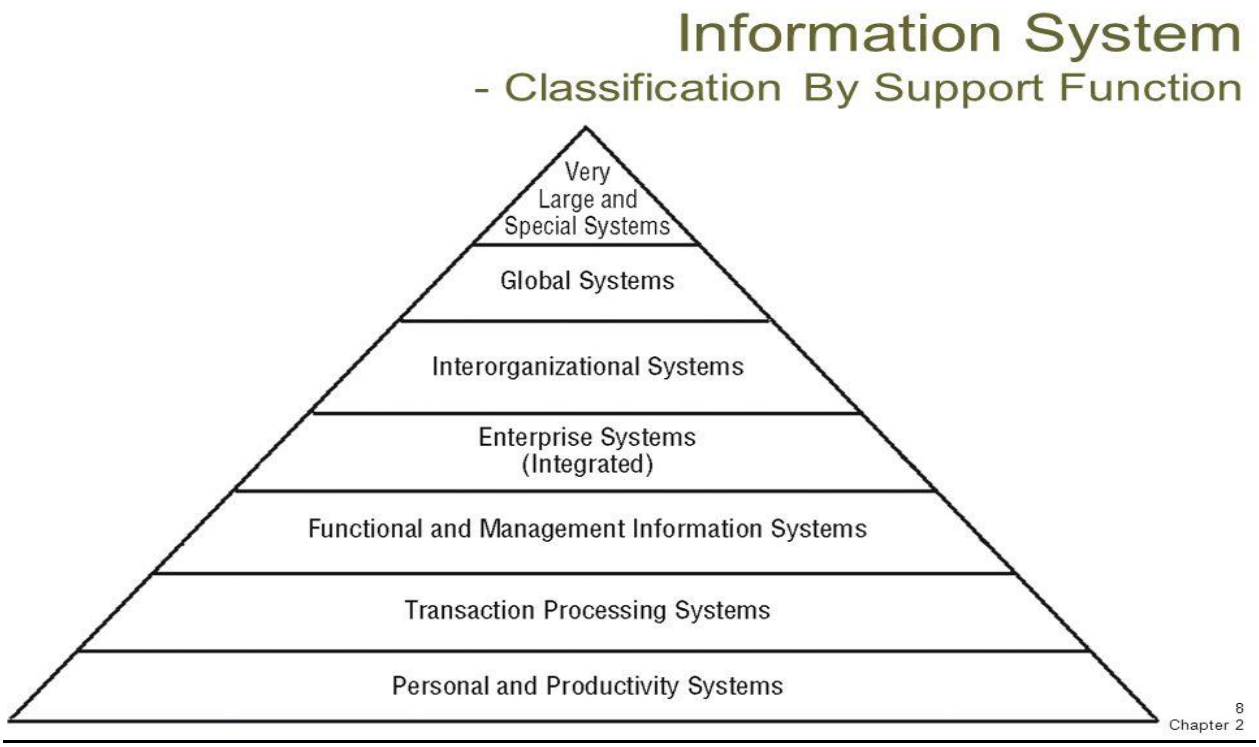
Rydhima Chopra

is built to attain one or several goals. The primary goal is to economically process data into information or knowledge. They can be inputs to an IS as well as outputs. It is made out of components that can be assembled in many different configurations, resulting in a variety of ISs and applications. Factors being the purpose, availability of money and other constraints**.**

Q6. What are the classification and types of IS?

Ans. <u>Classification of IS:</u> It is useful to classify IS into groups that share similar characteristics. Such classification may help in identifying systems, analyzing them, planning new systems, planning integration of systems and making decisions. IS is classified by organizational levels & by the type of source provided. Organizations are made up of components such as divisions, departments & work units, organized in traditional hierarchical levels. Such systems can stand alone, but usually they are interconnected.

<u>Levels of IS:</u>



PERSONAL AND PRODUCTIVITY SYSTEMS: They re the small systems that are built and intends to support the activities we, as individuals, perform to ease our work or life, through the acquisition, organization, maintenance, retrieval and sharing of information. They are designed to increase our productivity and satisfaction. They are abundant, inexpensive and have fairly standard capabilities. They are also known as **P**ersonal **I**nformation **M**anagement (PIM). Eg: **P**ersonal **D**igital **A**ssistant (PDA), with functions such as calendars, calculators, schedulers and computer memory.

Transaction Processing Systems(TPS): It supports repetitive information processing tasks that is performed periodically at regular intervals. It supports the monitoring, collection, storage, processing and dissemination of the organization's basic business transactions. It collects data continuously, frequently on a daily basis, or even in real time (i.e. as soon as they are generated) which is mostly stored in the corporate databases or data warehouse. It supports core operations such as Employee's salary, Purchase orders, financial statements, Tax records, Expense accounts, Sales records, Sales returns, material usage. Eg: In banking where monthly statements for customers are generated for bank services.

Functional Information Systems: They are put in place to ensure that business strategies come to fruition in an efficient manner. A Functional system provides periodic reports as operational efficiency, effectiveness and productivity by extracting information from databases and processing it according to the needs of the user. Each task can be divided into subtasks specifically designed to support functional activities. Functional areas cover activities in which some of these are repetitive, while others are only occasional such as Accounting, Finance, Production/Operations, Marketing, Sales and Human Resources Management. They are of 2 **types**:

1. System that support managers referred to as MIS
2. System that support other employees in the functional areas(Analysts, Schedulers, Staff)

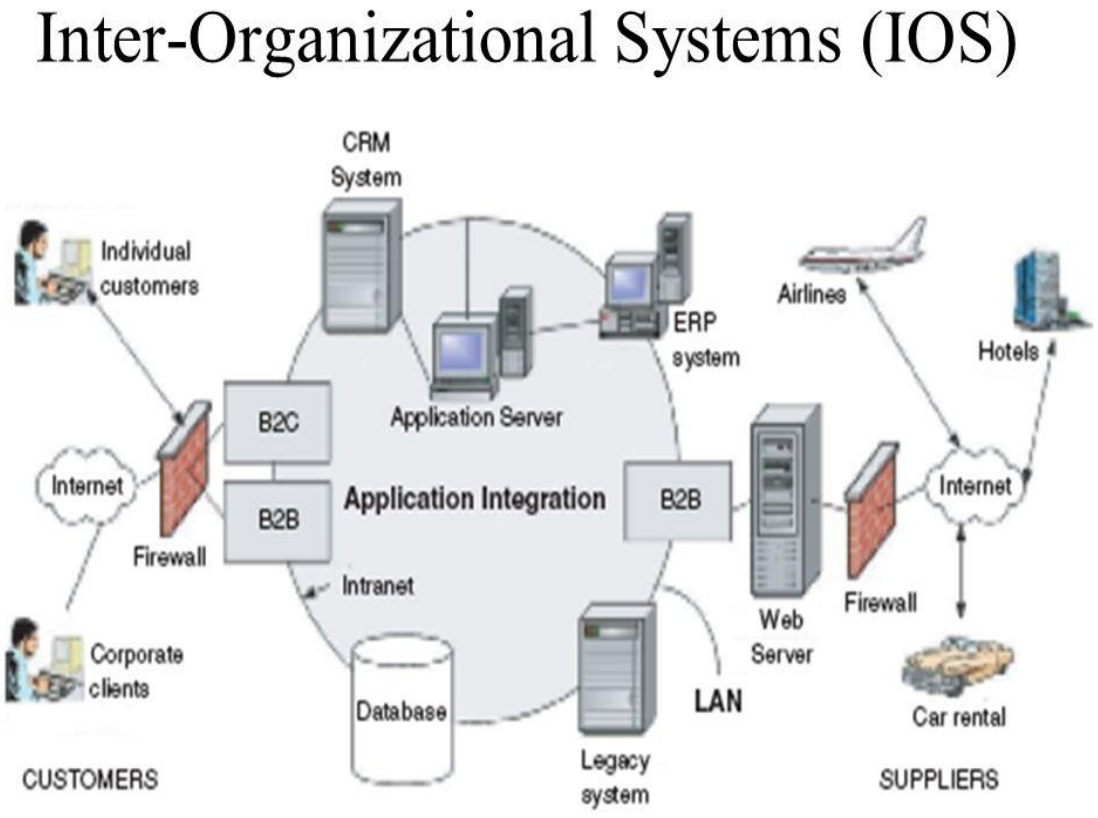
Management Information Systems (MIS): It support functional managers by providing them with periodic reports that include summaries, comparisons and

Rydhima Chopra

other statistics which can help the manager make better decisions. It is used for planning, monitoring and control. Eg: Weekly sales volume and comparison of actual expenses to the budget.

Enterprise Information System: Enterprise systems support business processes that are performed by 2 or more departments. It follows processes which will usually integrate tasks done in different departments. The activities in the process are frequently done in sequence, but some can be conducted simultaneously.

IOS: They connect 2 or more organizations. Most common IOSs are systems that connect sellers and buyers. One can order, bill and pay electronically. Such transactions can be supported by standardized computer languages.



Two or more organizations

GLOBAL INFORMATION SYSTEMS: IOSs that connect companies located in 2 or more countries. E Commerce systems are now global. Suppliers are overseas.

VERY LARGE & SPECIAL SYSTEMS: They are the systems are very large which include many subsystems. They are often global in nature.

Types of IS: Another way to classify IS is according to the type of support they provide, regardless of the functional area. Each support system has sufficiently unique characteristics that it can be classified as a special entity. It can be used as standalone system. Two or more support systems can be integrated to form a hybrid system which includes some intelligent components like BI-ES combination (**Integrated Support System**). Such integration provides extended functionalities which can provide solutions to complex problems.

Q7. What is "IS Infrastructure & architecture"?

Ans. IS Infrastructure: It consists of the physical facilities, services and management that support all shared computing resources in an organization. it has 5 major components:

- Hardware
- Software
- Networks and communication facilities
- Databases and Data workers
- Information management personnel

It includes these resources as well as their integration, operation, documentation, maintenance and management.

IS Architecture: It is a high-level map or plan of the information assets in an organization including the physical design of the building. It is a plan for the integration of IT resources and applications in the organization. It is a guide for current operations and a blueprint for future directions. It includes the interface to support browsing and search capabilities. It assures managers that the organization's IT structure will meet its strategic business needs. Creating it is a cyclical process, which is driven by the business architecture which describes organizational plans, visions, objectives, problems & the information required to

Rydhima Chopra

support them. Once the business architecture is finished, the system developer can start the process of building the IT architecture. Koontz suggested a 6-step process for developing an IT architecture which constitutes a hierarchy.

STEP 1: BUSINESS GOALS & VISION: The system analyst reviews the relevant business goals and vision. It is sometimes referred to as “business architecture”.

STEP 2: INFORMATION ARCHITECTURE: A company analyst defines the information necessary to fulfill the objectives of Step 1.It examine each objective and goal, identify the information currently available and determine what new information is needed. All potential users need to be involved.

STEP 3: DATA ARCHITECTURE: It determine data *architecture i.e. exactly what data you* have and what you want to get from customers, including Web-generated data. Of special interest is the investigation of all data that flows within the organization and to and from your business partners. The result of your investigation will probably show that data is everywhere, from data warehouses to mainframe files to Excel files on user’s PCs. Conduct an analysis of the data, understanding its use and examine the need for new data. Think about how to process this data and what tools to use. If large amounts of data are used, tools such as Microsoft Transaction Server, Tuxedo, or CICS for mainframe data should be considered. Analysis needs to be done with an eye toward security and privacy.

STEP 4: APPLICATION ARCHITECTURE: It defines the components or modules of the applications that will interface with the required data defined in Step 3. Build the conceptual framework of an application. Many vendors, such as IBM, Oracle and Microsoft, offer sophisticated IT application platforms that can significantly reduce the amount of code that programmers need to write. It also explains how the application should be structured. Other factors that must be considered are scalability, security, the number and size of servers and the networks. The need to interface with legacy systems and with sales ERP (**E**nterprise **R**esources **P**lanning), accounting and human resources data must be considered. The major output of this step is to define the software components that meet the data requirements.

Rydnia Chopra

STEP 5: TECHNICAL ARCHITECTURE: It formally examines the specific hardware and software required to support the analysis in the previous steps. An inventory of the existing information resources is made and an evaluation of the necessary upgrades and acquisitions is performed. Designers must examine the middleware needed for the application. EC applications require a considerable amount of transaction processing software. The more scalability and availability required, the more you need to invest in additional application servers and other hardware and software. When selecting a programming language, designers may consider Java, Visual Studio and even COBOL, depending on the application. Also in this step, the OS, transaction processors and networking devices required to support the applications must be decided on.

STEP 6: ORGANIZATIONAL ARCHITECTURE: An organizational architecture deals with the human resources and procedures required by Steps 1 through 5. The legal, administrative and financial constraints should be examined. For example, a lack of certain IT skills on your team may require hiring or retraining. Partial outsourcing may be a useful way to deal with skill deficiencies. In the worst-case scenario, you outsource the entire job, but you can give the architecture to the vendor as a starting point. Also, vendor selection can be improved if the architectures (business, information, data, application, and technical) are considered.

CONCLUSION: Creating IT architecture may be a lengthy process, but it is necessary to go through it. You may want to develop metrics to help you to track the effectiveness of your IT architecture, and you certainly need to document the process and output of each step. Once the IT architecture has been decided on, a development strategy can be formulated.

Q8. What is the role of IS in business today?

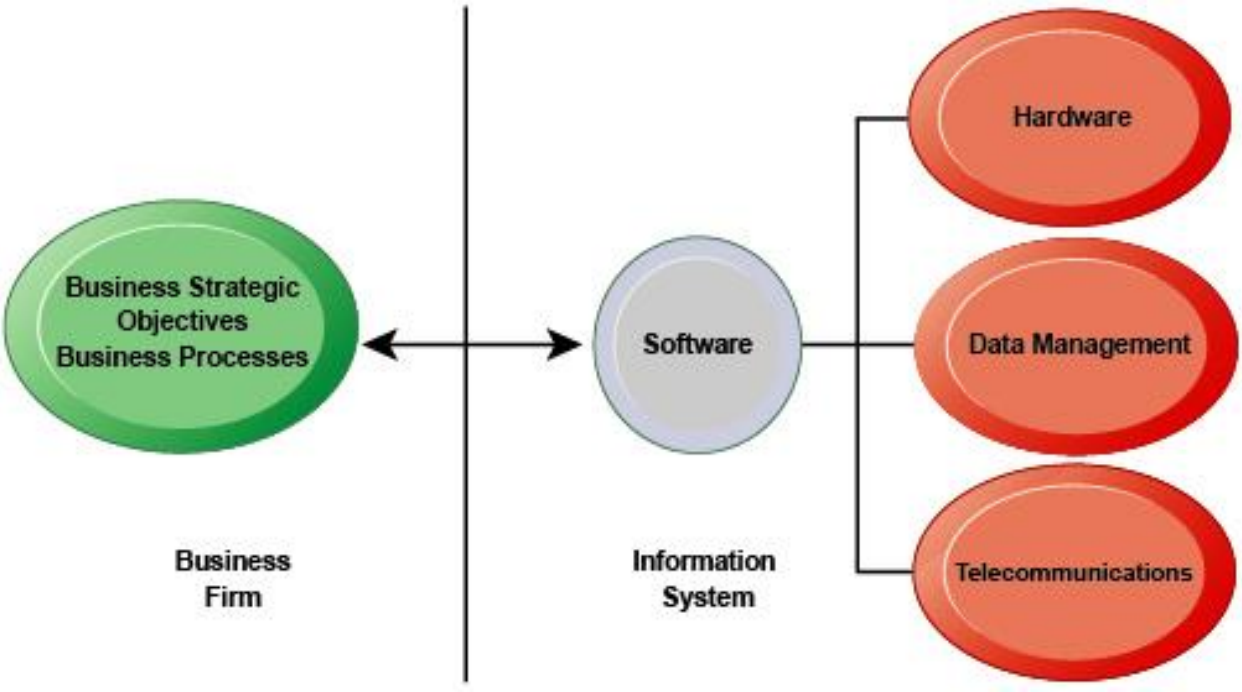
Ans. IT and systems have revolutionized firms and industries, becoming the largest component of capital investment. Investment in IT accounts for approximately 50% of all capital invested in the US. ISs are transforming business and the visible results of this include the increased use of cell phones and wireless telecommunication devices, a massive shift toward online news and information,

Rydhima Chopra

booming EC and internet advertising. The Internet has also drastically reduced the costs of businesses operating on a global scale. ISs are essential for conducting day-to-day business in most advanced countries as well as achieving strategic business objectives. For eg, Amazon. Some service industries, such as finance, insurance & real estate industries, could not operate without ISs. This changes have led to the emergence of the **digital firm**, a firm in which:

1. Most of the firm's significant business relationships with customers, suppliers and employees are digitally enabled.
2. Core business processes or logically-related business tasks are accomplished through digital networks.
3. Key corporate assets (intellectual property, finance and human) are managed through digital means.
4. Allowing for time shifting i.e. business being conducted 24*7.
5. Space shifting i.e. business being conducted globally.

<u>The Interdependence between organizations and ISs</u>:



There is a growing interdependence between a firm's ISs and its business capabilities. Changes in strategy, rules and business processes increasingly require changes in hardware, software, databases and telecommunications. Often, what

the organization would like to do depends on what its systems will permit it to do. Business firms invest heavily in ISs to achieve **6 strategic business objectives**:

1. **Operational excellence:** Efficiency, productivity and improved changes in business practices and management behavior.
2. **New products, services and business models:** A **business model** describes how a company produces, delivers and sells a product or service to create wealth. ISs and technologies create opportunities for products, services and new ways to engage in business.
3. **Customer and supplier intimacy:** Improved communication with and service to customer's raises revenues and improved communication with suppliers lowers costs.
4. **Improved decision making:** Without accurate & timely information, business managers must make decisions based on forecasts, best guesses and luck.
5. **Competitive advantage:** Implementing effective and efficient ISs can allow a company to charge less for superior products, adding up to higher sales and profits than their competitors.
6. **Survival:** ISs can also be a necessity of doing business. A necessity may be driven by industry-level changes, as in the implementation of ATMs in the retail banking industry. A necessity may also be driven by governmental regulations, such as federal or state statutes requiring a business to retain data and report specific information.

Q9. What are the software platforms to improve business performance?

Ans. There are 5 major themes in contemporary software platform evolution:

1. Linux and Open-source software(OSS)
2. Java
3. Enterprise software
4. Web services and service-oriented architecture
5. Software outsourcing

LINUX: it is the world's fastest growing client and server OS. The rise of OSS and the applications it supports has profound implications for corporate software platforms: cost reduction, reliability, resilience and integration, because Linux

Ryohna Chopra

works on all the major hardware platforms from mainframes to servers to clients. Linux has the potential to break Microsoft's monopoly of the desktop.

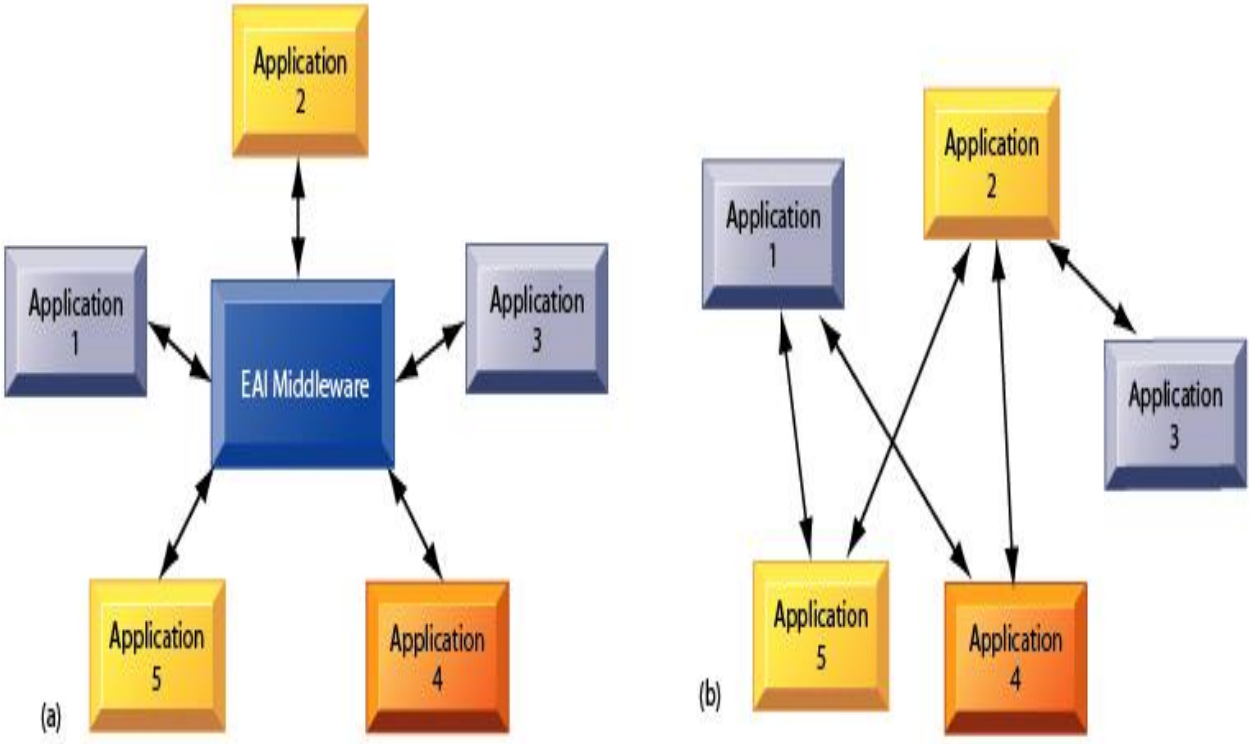
OSS: It is a computer program or software with its source code made available with a license in which the copyright holder provides the rights to study, change and distribute the software to anyone and for any purpose. It can be freely used and shared (in modified or unmodified form). Its design is publically accessible. Programmers who have access can improve the program by adding features to it and fixing or correcting errors or omissions that a program's original authors might have missed. Many people prefer OSS because they have control over it. They can examine the code to make sure it is not doing anything they don't want it to do and they can change parts of it they don't like. They can use this software for any purpose they wish- not merely the way someone else thinks they should. It is a good tool for business to achieve greater penetration of the market. Companies that offer OSS are able to establish an industry standard and thus gain competitive edge . Eg: Mozilla Firefox, Linux, Android (an operating system (OS) for mobile devices), etc. It offers potential for a more flexible technology and quicker innovation.

JAVA: It is an OS-independent, object-oriented programming language. It has become the leading programming environment for the Web. Its use has migrated into cellular phones, cars, music players and more. For each of the computing environments in which Java is used, Sun has created a Java Virtual Machine (JVM) that interprets Java programming code for that machine. In this manner, the code is written once and can be used on any machine for which there exists a JVM. A Macintosh PC, an IBM PC running Windows, a Sun server running UNIX and even a smart cellular phone or personal digital assistant can share the same Java application. It is typically used to create small Web programs called Applets, but is also a very robust language designed to handle text, data, graphics, sound and video. It enables PC users to manipulate data on networked systems using Web browsers, reducing the need to write specialized software.

ENTERPRISE SOFTWARE: Software for enterprise integration is one of the most urgent software priorities today for U.S. firms who need to integrate existing

Rydhima Chopra

legacy software with newer technology. Replacing isolated systems that cannot communicate with enterprise software is one solution; however, many companies cannot simply jettison essential legacy mainframe applications. Some integration can be achieved by **Middleware (**software that creates an interface or bridge between 2 different systems). Firms increasingly purchase **Enterprise Application Integration (EAI) software** that enables multiple systems to exchange data through a single software hub.

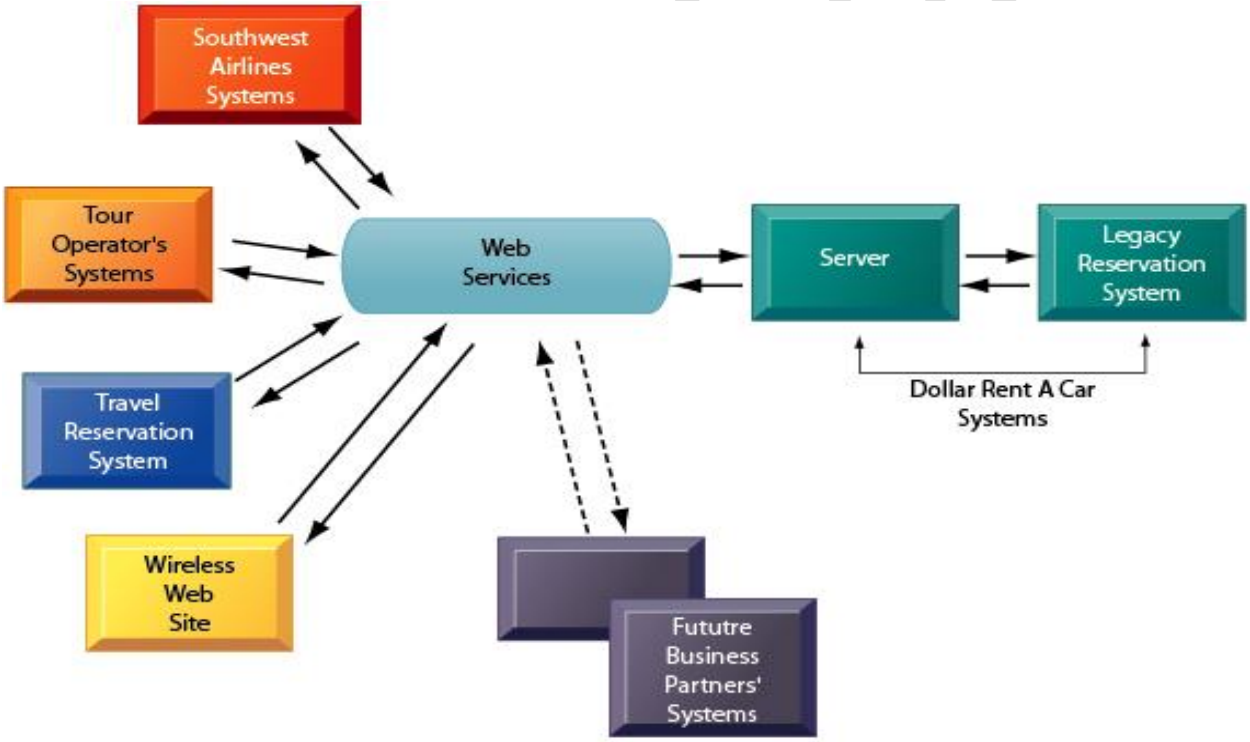


EAI software (a) uses special middleware that creates a common platform with which all applications can freely communicate with each other. EAI requires much less programming than traditional point-to-point integration (b).

WEB SERVICES: Loosely coupled software components that use Web communication standards, can exchange information between different systems regardless of OS of programming language.

- Technology is founded on **Extensible Markup Language (XML)** which was developed as a more powerful language than HTML. By marking data with XML tags, computers can interpret, manipulate and exchange data from different systems.

- Communicate through XML messages over standard Web protocols, such as **SOAP(Simple Object Access Protocol)** is a set of rules for structuring messages that enables applications to pass data and instructions to one another. **WSDL (Web Services Description Language)** is a common framework for describing the tasks performed by a Web service and the commands data it will accept so that it can be used by other applications. **UDDI (Universal Description, Discovery & Integration)** enables a Web service to be listed in a directory of Web services so that it can be easily located. Using these protocols, a software application can connect freely to other applications without custom programming for each different application with which it wants to communicate.



Dollar Rent A Car uses Web services to provide a standard intermediate layer of software to "talk" to other companies' ISs. Dollar Rent A Car can use this set of Web services to link to other companies' ISs without having to build a separate link to each firm's systems.

Service-Oriented Architecture (SOA): The collection of Web services used to build a firm's software systems. In an SOA environment, a single application can be used and reused as a "service" that can be used by other services. For eg, an

"invoice service" can be written which is the only program in the firm responsible to calculate invoice information and reports. Virtually all major software vendors provide tools and entire platforms for building and integrating software applications using Web services.

SOFTWARE OUTSOURCING: Although traditionally businesses developed unique software themselves, today most new software is purchased from external sources. There are 3 external sources for software:

1. Commercial software packages
2. Software services from an Application Service Provider(ASP)
3. Outsourcing application development to an outside software firm

A Commercial Software package is a prewritten set of software programs for certain functions, eliminating the need for a firm to write its own software program. Enterprise systems are so complex that few corporations have the expertise to develop these in house and instead rely on enterprise software packages from vendors such as SAP and PeopleSoft. An ASP is a business that delivers and manages applications and computer services from remote computer centers to multiple users using the Internet or a private network. The software is paid for typically on a per-user, subscription, or per-transaction basis. Renting enterprise software avoids the expense & difficulty of installing, operating and maintaining the hardware and software needed for complex systems. Large and medium-sized businesses are using ASPs for enterprise systems, sales force automation or financial management and small businesses are using them for functions such as invoicing, tax calculations, electronic calendars and accounting. ASPs also enable small and medium-sized companies to use applications that they otherwise could not afford. In outsourcing, a firm contracts custom software development or maintenance to outside firms, frequently firms operating in low-wage areas of the world. With the growing sophistication and experience of offshore firms, more and more new-program development is outsourced. Other software trends include:

Ryohma Chopra

- **Ajax(Asynchronous JavaScript and XML):** Ajax and a related set of techniques called **RIA** (Rich Internet Applications) use JavaScript or Macromedia Flash programs downloaded to your client to maintain a near continuous conversation with the server you are using. While making the life of consumers much easier, Ajax and RIA are even more important for another new software development.
- **Web-based applications:** Software firms are delivering software services over the Web to client computers and their customer's sites. Google's Google Apps for Your Domain is a Web-based suite of productivity tools, including online spreadsheet, word processing and calendars, aimed at small businesses.

- **Mashups:** Part of a movement called Web 2.0 and in the spirit of musical mashups, Web **mashups** combine the capabilities of two or more online applications to create a kind of hybrid that provides more customer value than the original sources alone. For example, housingmaps.com can display real estate listings in local areas from Craigslist.com overlaid on Google Maps, with pushpins showing the location of each listing. The result of these techniques is that instead of the Web being a collection of pages, it becomes a collection of capabilities, a platform where thousands of programmers can create new services quickly and inexpensively.

- **Web 2.0** refers to "the new Web applications" like those above and is also the name of an annual conference. Web 2.0 can be described also as an expression of all the changes above, plus changes in the way people and business use the Web and think about human interaction on the Web. These changes include seeing the Web applications as services, not packaged software, seeing users as co-developers, harnessing collective intelligence and lightweight user interfaces, development models and business models.

Rohina Chopra

Q10. What are the hardware platforms to improve business performance?

Ans. While the cost of computing has fallen, IT infrastructure expenditures have grown due to the rising cost of computing services, software and the increase in intensity and sophistication of computing. Telecommunications and computing platforms have converged: at the client level, with the merging of PDAs and cell phones, and at the server and network level, with the rise of Internet telephony.

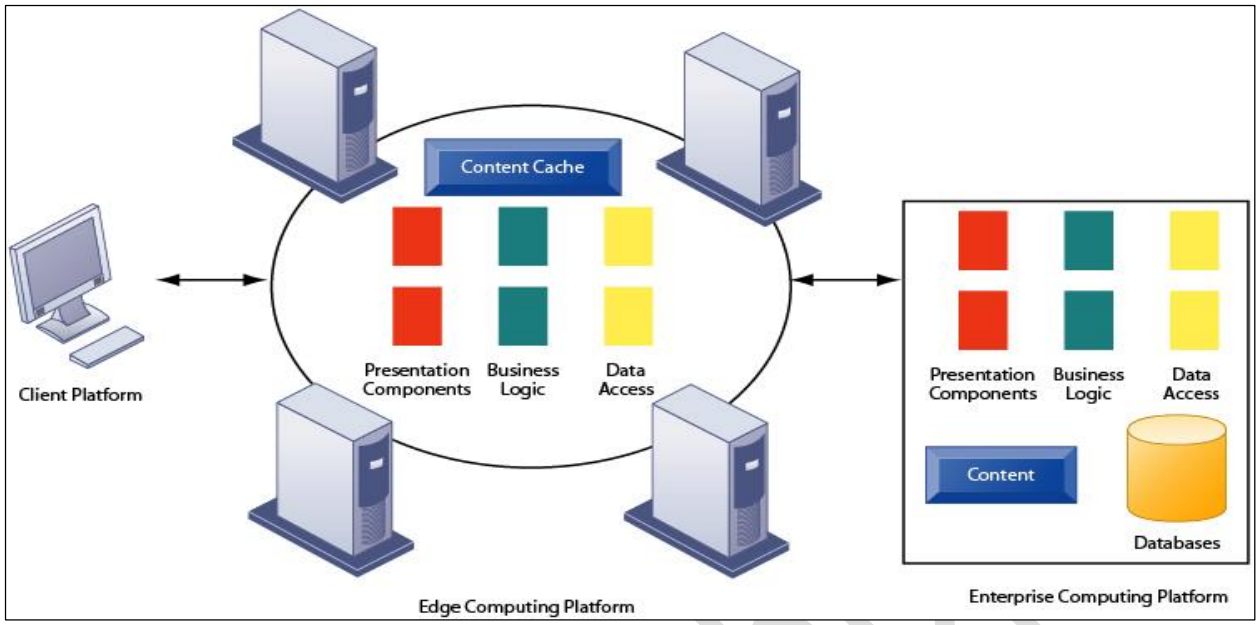
Grid computing utilizes the idle computational resources of separate, geographically remote computers to create a single virtual supercomputer. In this process, a server computer breaks data and applications into discrete chunks that are parceled out to the grid's machines. Grid computing offers increased cost savings, computational speed and agility.

On-demand computing or **Utility computing** refers to firms off-loading peak demand for computing power to remote, large-scale data processing centers. This allows firms to reduce their investment in IT infrastructure by investing in only as much computing power as needed on average and paying for additional power on an as-needed basis. This arrangement offers firms much greater agility and flexibility in their infrastructure.

Autonomic computing is an industry-wide effort to develop systems that can configure, optimize, repair and protect themselves against intruders and viruses, in an effort to free system administrators from routine system management, reduce costly system crashes. Eg: Virus software with automatic virus updates.

Edge computing is a multi-tier, load-balancing scheme for Web-based applications in which parts of the Web site content and processing are performed by smaller, less expensive servers located near the computer. In an edge computing platform client requests are initially processed by the edge servers, which may deliver static presentation content, reusable code, while database and business logic components are delivered by the enterprise servers.

Ryan Chopra



Edge computing involves the use of the Internet to balance the processing load of enterprise platforms across the client & edge computing platform.

As companies deploy hundreds or thousands of servers, many have discovered that they are spending more on electricity to power and cool their systems than they did on acquiring the hardware. Power consumption can be lowered through virtualization and multicore processors.

Virtualization is the process of presenting a set of computing resources (such as computing power or data storage) so that they can all be accessed in ways that are not restricted by physical configuration or geographic location. Server virtualization enables companies to run more than one OS at the same time on a single machine. Most servers run at just 10 to 15% of capacity and virtualization can boost utilization server utilization rates to 70% or higher.

A **Multicore processor** is an integrated circuit that contains 2 or more processors. This technology enables 2 or more processing engines with reduced power requirements and heat dissipation to perform tasks faster than a resource-hungry chip with a single processing core.

Q11. What are the various Management opportunities, challenges & solutions?

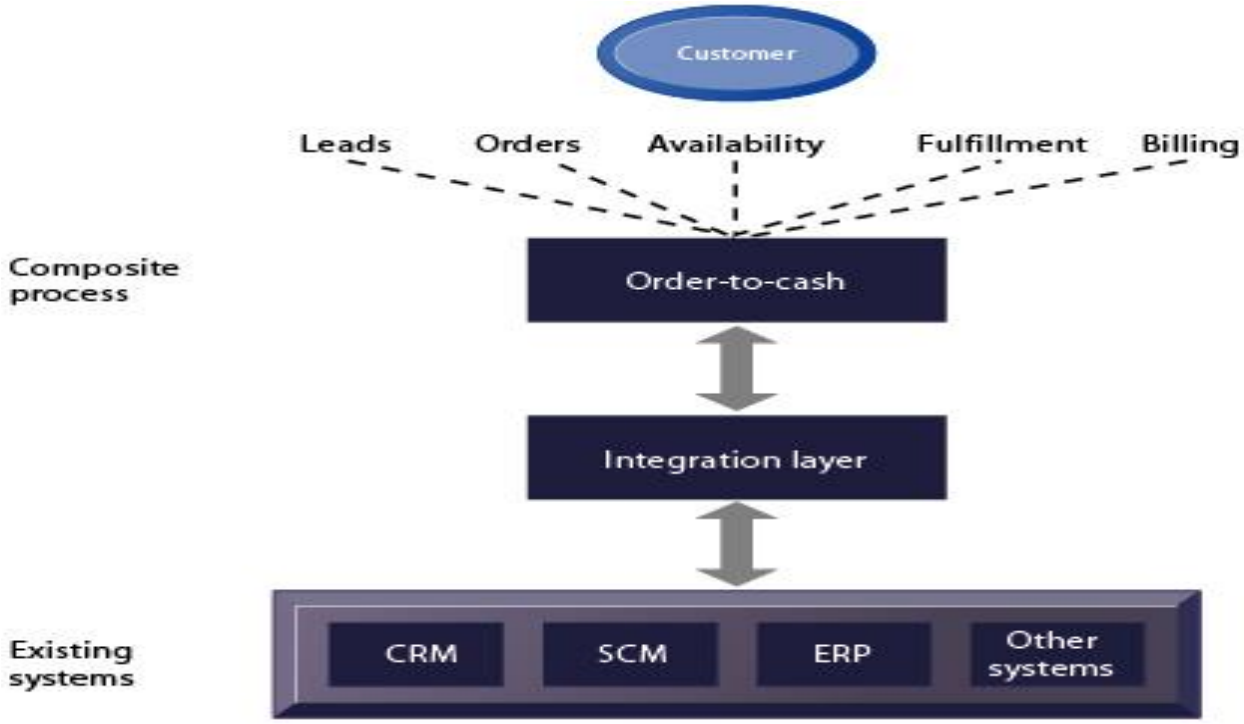
Ans. MANAGEMENT CHALLENGES: Many firms obtain extraordinary business value from enterprise applications because of their power to improve process coordination and management decision making. However, enterprise systems, SCM (Supply Chain Management) and CRM (Customer Relationship Management) systems are very expensive to purchase and implement. Costs run even higher for organizations with global operations, which must manage organizational and technology changes in many different languages, time zones, currencies and regulatory environments. Enterprise applications require not only deep-seated technological changes but also fundamental changes in the way the business operates, including changes to business processes, employee responsibilities and functions. Enterprise applications also introduce "switching costs." Once an enterprise application is purchased and implemented, it becomes very costly to switch vendors. Enterprise applications require defining and implementing standardized definitions of data throughout the organization.

Solutions for gaining more value from enterprise applications include:

ENTERPRISE SOLUTIONS (ENTERPRISE SUITES or E-BUSINESS SUITES): Flexible enterprise software that enables close linking between CRM and SCM and enterprise systems, as well as to customer and supplier systems.

SERVICE PLATFORMS: A service platform integrates multiple applications from multiple business functions, business units, or business partners to deliver a seamless experience for the customer, employee, manager or business partner. Enterprise-wide service platforms provide a greater degree of cross-functional integration than the traditional enterprise applications. To accomplish this, software tools (such as Web services and XML) use existing applications as building blocks for new cross-enterprise processes. Portal software can integrate information from enterprise applications and disparate in-house legacy systems, presenting it to users through a Web interface so that the information appears to be coming from a single source. Order-to-cash is a composite process that integrates data from individual enterprise applications and legacy financial applications. The process must be modeled and translated into a software system using application integration tools.

Rohini Chopra



Q12. What is the Role of IT in E-Commerce?

Ans. The 3 major types of EC are:

1. **BUSINESS-TO-CONSUMER (B2C):** Retailing products and services to individual shoppers.
2. **BUSINESS-TO-BUSINESS (B2B):** Sales of goods and services among businesses.
3. **CONSUMER-TO-CONSUMER (C2C):** Consumers selling directly to other consumers.

Another way of classifying EC transactions is in terms of the participants' physical connection to the Web. Conventional EC transactions, which take place over wired networks, can be distinguished from mobile commerce (M-Commerce), the purchase of goods and services using handheld wireless devices. Marketers can use the interactive features of Web pages to hold consumers' attention or to capture information about their tastes and interests. This information may be obtained by asking visitors to "register" online and provide information about themselves or by using special software such as clickstream tracking to track the activities of Web site visitors. Companies can then analyze this information to develop more precise profiles of their customers. EC Web sites have tools to track

a shopper’s every step through an online store. Close examination of customer behavior at a Web site selling women’s clothing shows what the store might learn at each step and what actions it could take to increase sales. Communications and product offerings can also be tailored precisely to individual customers. By using Web personalization technology to modify Web pages presented to each customer, marketers can achieve the benefits of using individual salespeople at dramatically lower costs. Personalization can help firms form lasting relationships with customers by providing individualized content, information and services.

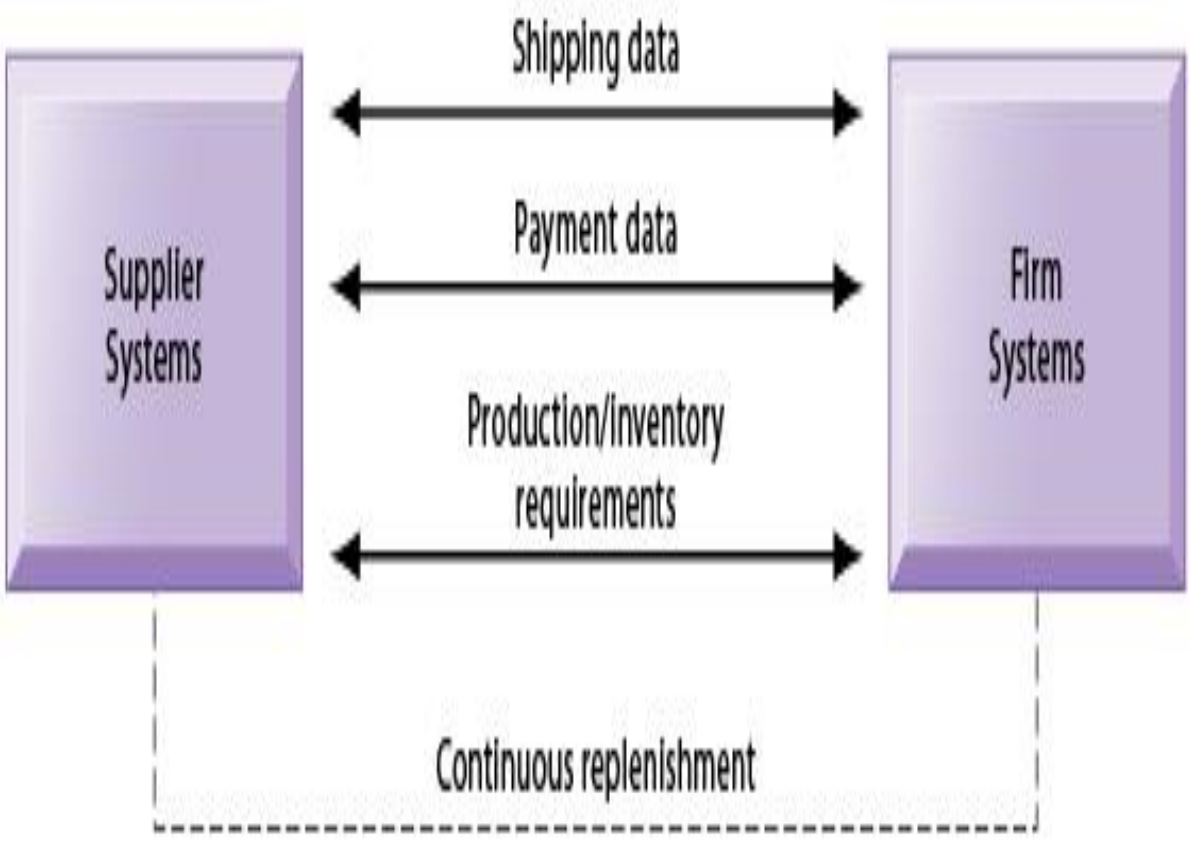
Collaborative filtering compares a customer's behavior with data about similar customers to predict what the customer would like to see next and makes recommendations to users.

Rydhima Chopra

Firms can create unique personalized Web pages that display content or ads for products or services of special interest to individual users, improving the customer experience and creating additional value.

Blogs or Weblogs, informal web sites where individuals or corporate representatives and groups can publish views and options have emerged as a promising Web marketing tool. New third-party services monitor customer discussions in online communities or research online behavior of large numbers of customers at many different web sites. Learning what customers feel about one's products or services through electronic visits to Web sites is much less costly than using focus groups. The Web shifts more marketing and selling activities to the

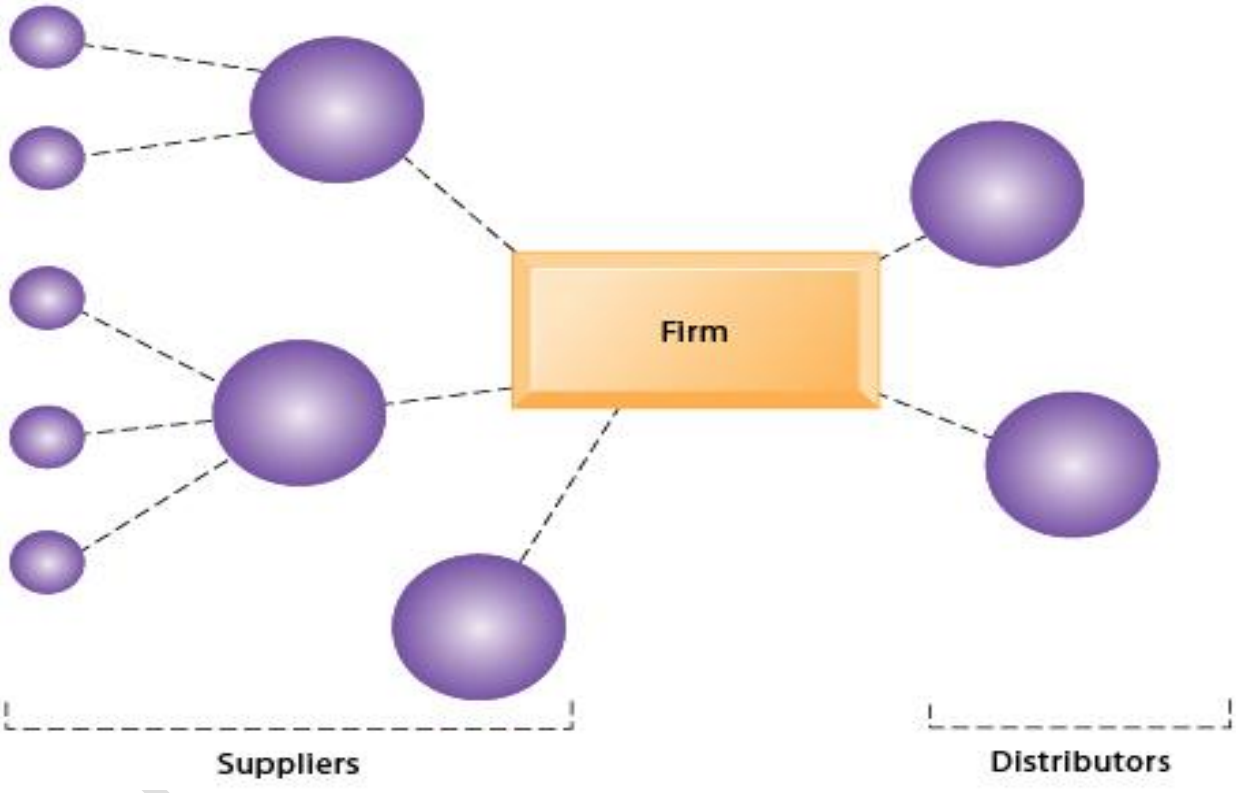
customer, as customers fill out their own on-line order forms. M-Commerce will provide businesses with additional channels for reaching customers and new opportunities for personalization. The Web and other network technologies are inspiring new approaches to customer service and support. Companies can reduce costs and improve customer service by using Web sites to provide helpful information as well as customer support via e-mail. Companies are realizing substantial cost savings from Web-based customer self-service applications. New products are even integrating the Web with customer **call centers**. Much of B2B EC is still based on proprietary systems for **Electronic Data Interchange** (EDI) which enables automated computer-to-computer exchange between 2 organizations of standard transactions such as invoices, bills of lading, shipment schedules or purchase orders.



Companies use EDI to automate transactions for B2B e-commerce and continuous inventory replenishment. Suppliers can automatically send data about shipments to purchasing firms. The purchasing firms can use EDI to provide production and inventory requirements and payment data to suppliers.

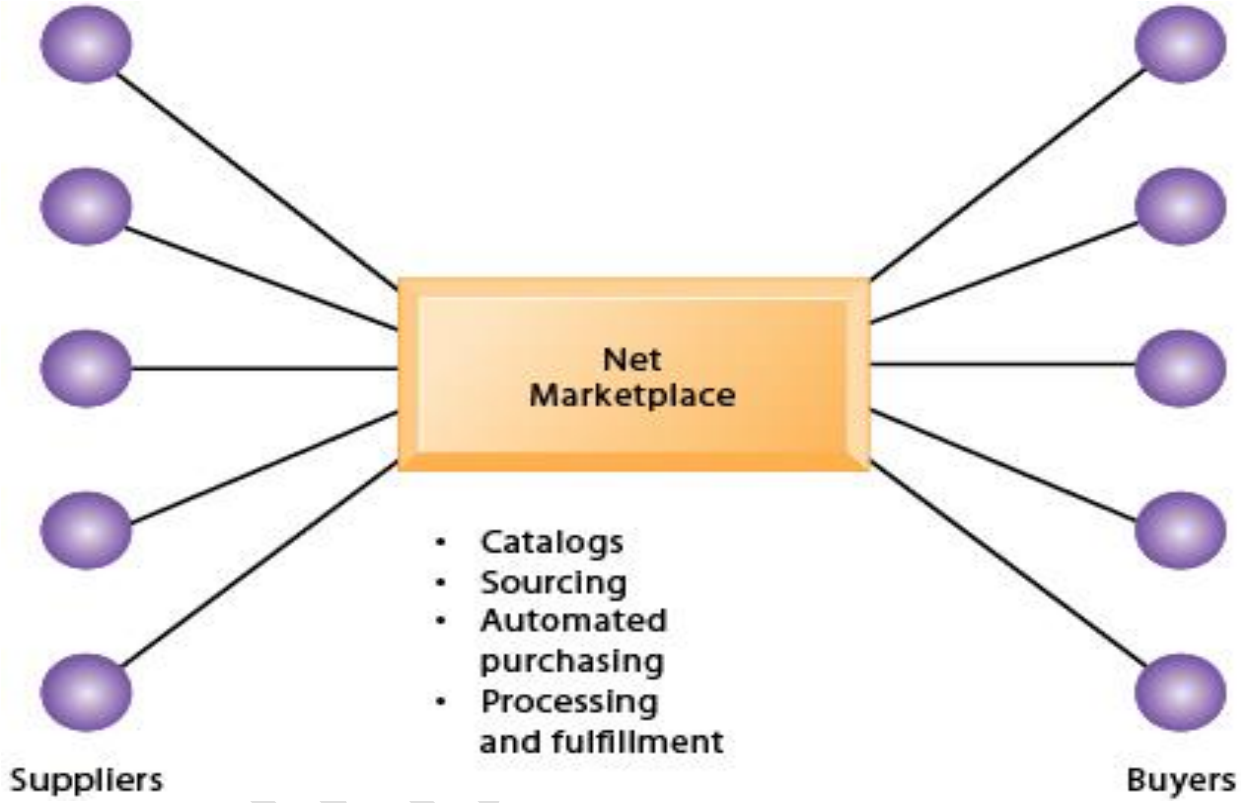
Today companies are increasingly turning to the Internet for this purpose because it provides a much more flexible and low-cost platform for linking to other firms. For procurement (purchasing source goods and negotiation with suppliers), businesses can use the Internet to locate low-cost goods, place orders, make payments, etc. Businesses can create Web storefronts to sell goods and Internet technology to create extranets or link to other businesses for transactions. B2B EC environments include:

PRIVATE INDUSTRIAL NETWORKS or **PRIVATE EXCHANGES**: Typically consisting of a large firm using an extranet to link to its suppliers, distributors and other key business partners for efficient SCM and other collaborative commerce activities.



Net marketplaces or **e-hubs**: Internet-based marketplaces or online marketplaces where multiple buyers can purchase from multiple sellers. Net marketplaces are industry owned or operate as independent intermediaries between buyers and sellers, generating revenue from transaction fees or services to clients. Net marketplaces may sell direct goods (used in a production process) and some sell indirect goods. They may support contractual purchasing based on long-term

relationships with designated suppliers and others support short-term spot purchasing, where goods are purchased based on immediate needs, often from many different suppliers. Some net marketplaces may serve vertical markets for specific industries or horizontal markets, with goods and services for many industries.



EXCHANGES: Independently owned third-party Net marketplaces that can connect thousands of suppliers and buyers for spot purchasing. Many exchanges provide vertical markets for a single industry. However, many exchanges have failed because they encourage competitive bidding that drove prices down without offering long-term relationships.

Q13. What is the role of IT in M-Commerce?

Ans. M-commerce applications have taken off for services that are time-critical, that appeal to people on the move, or that accomplishes a task more efficiently than other methods. Popular m-commerce applications include:

Content and location-based services: For checking travel information, schedules, news, movie times, weather forecasts, etc

Banking and financial services: For checking account balances, transferring funds, paying bills

Wireless advertising: Selling of advertising space in m-commerce applications, such as sponsored search results from the go2Directory search site

Games and entertainment: Downloadable digital games, movies, music and ringtones

Because handheld mobile devices can only display small amounts of information at a time, m-commerce enabled Web sites are being designed as special **wireless portals** (mobile portals) with content optimized for smaller screens.

UNIT 3

Q14. What do you mean by Acquisition of IT?

Ans. Technology acquisitions involve bringing in new technologies from external sources rather than using the firm's own internal Research and Development (R&D) activities. Specialist technical expertise and capabilities are often difficult to obtain and a firm may not have the ability- or wish to commit the resources- to develop a technology internally. Bringing in new technologies can provide the company with the opportunity both to develop new products and to enter new markets. Technology can be acquired in a number of ways. Understanding the various options available and deciding which might be best in particular circumstances can be challenging. By its nature, **Technology Acquisition** is a technology transfer, with transaction costs associated with the various stages of the acquisition process. This is further complicated by the number of possible routes technology acquisition can take, with these possibilities including mergers and acquisitions of entire companies, licensing, subcontracting, alliances, joint R&D and industry-university collaboration. In all cases there is a need to devote substantial resources to assimilate, adapt and improve upon the original technology and to put suitable strategies in place to protect it. There are

Ryohma Chopra

particular challenges associated with the transfer of technology for each of these sourcing mechanisms.

STEPS INVOLVED IN TECHNOLOGY ACQUISITIONS: The process of technology acquisition requires:

1. Identification of attractive technologies or partners with technological capabilities.
2. Assessment of these opportunities, selection of the most promising ones and consideration of the terms of the acquisition.
3. Negotiation of the terms of acquisition between acquires and sellers.
4. Transfer of the technology to the acquirer, if these negotiations have been successful.

The assessment and negotiation stages form a cycle as it is expected that the terms discussed during negotiations will need to be re-assessed before acceptance. The report sections of the assessment process are structured around the following 3 stages:

- **ACQUISITION CONTEXT**:
  - Understanding and defining the issues that need to be to considered.
  - This section leads to the definition of a detailed framework for the acquisition, including the acquisition motives, the different types of partners that could be involved, the desired technology readiness level and an overview of the most likely technology acquisition scenarios.
- **ACQUISITION EVALUATION:**
  - Assessing whether a potential acquisition is a good match.
  - Involves assessing the match between technological capabilities and market opportunities, as well as the capability of the firm to absorb and make good use of the technologies that other firms are developing.
  - Provides a checklist of questions to evaluate the partner-technology-absorptive capacity combination.
- **ACQUISITION OPTIONS**:
  - If the evaluation of a potential acquisition has yielded a positive result, the next step is to consider the detailed terms of the acquisition.
  - Provides guidance to evaluate the different options associated with such issues as future technological development, protection strategies, the type of contract governing the relationship and the transaction currency.

Rupima Chopra

- Provides open ended questions and case study examples to support evaluation of the advantages and disadvantages of each strategic option.
- It is recommended that the possible options are discussed widely within the company involving as many roles as possible, including innovations and R&D managers, IP and legal officers and product, business and finance managers.

Before making any decisions in relation to a proposed technology acquisition it is essential to consider the context in which it is taking place and to identify the key issues involved. A structured approach will help to reduce the complexity of all the possible scenarios and ensure that those involved remain objective and focused on the most important questions.

- Why do we want to acquire the technology?
- Who are we going to acquire the technology from?
- How mature is the technology and how might this affect our acquisition options?

Q15. Why do we want to acquire the technology?

Ans. An organization's motive for wanting to acquire a technology will affect the kind of technology they are looking for, the partners from whom they decide to acquire it and the process they follow to make the acquisition. There are a wide variety of motivations which can be broadly classified into 4 categories:

1. Developing new technological capabilities
2. Increasing strategic options
3. Gaining efficiency improvements
4. Responding to the competitive environment

DEVELOPING NEW TECHNOLOGICAL CAPABILITIES: One of the fundamental motivations for the acquisition of external technologies is the need to develop new technological capabilities and to fill gaps in the R&D knowledge base. The objective of these acquisitions is either to fill holes in an existing product line or to create and establish a brand new product. This need may arise because specialist technical expertise and capabilities are often difficult to obtain and firms may not have the ability to develop these valuable knowledge-based resources internally. This may be the case, for instance, when the technological knowledge of a firm is

Ruchira Chopra

close to exhaustion and most of the possible technological combinations have already been tried.

INCREASING STRATEGIC OPTIONS: Acquisitions can enable a firm to improve its strategic flexibility. Increasing its internal technological capabilities, can give the company more strategic options, allowing it to select the best available technology. For eg:

- Acquisitions can encourage innovation, countering inertia and rigidity and increasing R&D productivity. Relying on incremental improvements to existing technologies may limit a firm's potential. Experimenting with novel and emerging technologies can provide opportunities for more radical innovation.
- Acquisition can open new markets, allowing the knowledge of new customers, channels, inputs, processes and markets to be exploited.
- Acquisitions may help to deal with uncertainty and risk. Companies operating in high-tech industries are often dependent on uncertain future outcomes or developments. In such cases, managers are more likely to avoid risky internal investments in R&D with long-term payback periods, investing instead in external technologies as a way of keeping their options open until the risks and uncertainty diminish.

GAINING EFFICIENCY IMPROVEMENTS: The need to innovate more rapidly is another motivation for technological acquisition as it can reduce the time. The internal development of new capabilities may take too long or be too costly. Technology acquisition can create these more quickly so that the firm can be more responsive to market demands. There are often cost advantages to acquiring technologies externally. Firms substitute fixed investment costs with variable acquisition costs which can be recovered via profits from new businesses that follow a partnership-based strategy.

RESPONDING TO THE COMPETITIVE ENVIRONMENT: Firms are more likely to consider technology acquisitions as environments become more hostile, when there is rapid technological change and fast-moving competition in their market area. Acquiring technologies helps the firm to feel less vulnerable and more competitive. In such an environment it is likely there will be a greater use of

Ryan Chopra

partnerships, collaborations and outsourcing as a substitute for in-house activities.

Q16. Who are we going to acquire the technology from?

Ans. Technology can be acquired from a number of different kinds of sources including private companies, universities and government agencies. It may be acquired from a single organization, or more than one can be involved, sometimes in the form of a Consortium. It is important to understand the characteristics of your potential partner(s) as these will determine their expectations and behavior during collaborations. Examples of the different perspectives and characteristics of some of the organizations that may be involved are:

- ✓ Universities
- ✓ Start-up companies
- ✓ Consortia

UNIVERSITIES: Universities are increasingly interested in the commercialization of research but are generally inexperienced. Regulations regarding ownership of academic research outputs vary from country to country. An element of tension exists between academics who wish to publish results and industry which prioritizes the filling of patents. An additional issue is that high turnover of people in academia might lead to information leaks.

START-UP COMPANIES: Start-ups can be an important source of ideas for larger companies. However, they are typically lacking in resources and business knowledge and are often subject to the influence of their investors (eg: Venture Capitalists). They may be more flexible but also more volatile than established firms. They may own only one technology and the fear of losing control over it might lead to over protective attitudes. Partnerships between start-ups and established firms can be mutually beneficial as there are ways to increase the chances of success.

CONSORTIA: A firm gets together with other types of organizations (any mix of universities, industry and government bodies) typically to tackle complex

Rohima Chopra

technological issues which would be difficult to deal with in isolation. They are more common in industries with long technology life cycles such as pharmaceuticals. This industry requires access to a wider set of competences beyond the traditional areas of chemistry and pharmacology- such as molecular, biological, nanotechnology and computational science- to guarantee future innovation.

UNIT 4

Q17. What is Impact of IT on organization?

Ans. Technology can be used to dramatically restructure organizations, permanently changing the way they do business. Technology has contributed to flexibility when looking at the organization as a whole, even though users may consider individual applications to be inflexible. The IT variables have the greatest potential for transforming the organization because they provide a way to significantly change the structure of an existing organization or design an entirely new nontraditional one. Over the next few years, the ability to use technology to create novel organizational structures may turn out to be IT's most significant contribution yet. ISs exist in the context of an organization; they do not operate in isolation. An organization is a rational coordination of activities of a group of people for the purpose of achieving some goal. The activities of the group of people are coordinated i,e. there is a joint effort. In most organizations some division of labor & a management layer provide for the rational coordination of activities. The definition also contains the goals of the organization. There are many different types of organizations with different kinds of goals:

1. The **Formal organization** is what appears on the organization chart, usually with well-defined reporting relationships among managers and workers that describe its structure.
2. **Social organizations,** are the patterns of coordination that arise spontaneously from the interaction of a group. They have no rational coordinated structure and generally lack explicit goals.
3. The **Informal organization** is the pattern of relations and coordination among members of the formal organization that is not specified on a formal chart. It represents the social interaction and is a more realistic portrayal of

Ryolima Chopra

the formal organization because it reflects how people actually interact. For eg, a group of workers may form an informal task force using E-Mail or conferencing systems on a computer network. This task force cuts across traditional organizational boundaries and constitutes a temporary, informal organization.

We must be careful to avoid designing ISs that follow unrealistic standards and procedures. We may find that these prescribed rules are not actually followed and that our system is unworkable because we have adhered too closely to formal organizational considerations. It is hard to observe and describe the informal organization as it depends on the personalities of specific individuals and patterns of behavior that have developed over time.

Q18. Write a note on "Modern organizations"?

Ans. <u>ORGANIZATIONAL STRUCTURE & DESIGN:</u> There are many factors that influence the structure and design of modern organizations. New IT also offers opportunities to create exciting new forms of organizations.

1. **UNCERTAINTY**: It is one of the major factors influencing organizations. An organization & its managers confront many different types and degrees of uncertainty and they try to eliminate or reduce it. There are frequently technical uncertainties about whether a new product can be manufactured or whether it will work. Market uncertainties exist when the firm does not know how a product will be received, potential demand, response from competitors and so on. The internal management of an organization also creates uncertainty. Key personnel may leave or individuals may not adequately perform their assigned tasks. The importance of uncertainty is seen by examining organizations that face differing environments. Consider a chip manufacturer like Intel confronted with the dynamic environment of technological change versus the staid, conservative atmosphere of a regulated utility facing virtually no uncertainty. There is some evidence that uncertainty is most effectively handled by decentralizing decision making to a management level in the organization with information to resolve it.
2. **SPECIALIZATION:** It is another major consideration in organizational design. They are specialized skills required for some tasks.Consider the activity of running a complicated machine tool versus a very simple task; certainly, the former requires a specialist. From our standpoint, the information services department is highly specialized and requires a level of technological proficiency on the part of its staff.

Rynna Chopra

3. **COORDINATION:** When there is specialization, one task of management is to coordinate the diverse specialties to achieve the goals of the organization. Management must balance differing orientations and resolve disputes between specialized subunits. For eg, the marketing department may want to produce a particular item in each style and color for every warehouse. This plan is best for reducing uncertainty and providing good customer service. On the other hand, manufacturing may want to make products of the same color & model because this procedure reduces the uncertainties in production; i.e. there are fewer setups and smoother production runs. There are a number of integrating mechanisms to reduce the effects of differentiation or specialization. Sometimes organizations create special liaison positions or even departments to foster coordination. A major advertising agency has a group of expediters who see that the details of purchasing advertising time & space are organized & that the ads appear in the right place at the right time
4. **INTERDEPENDENCE:** It tells how do the different departments or subunits within the organization depend on each other. Thompson has described 3 types of mutual dependence:
    - ✓ **Pooled interdependence** occurs when 2 organizations depend on each other because they are all components of a larger organization; one unit does not depend directly on another. For eg, the different divisions of a conglomerate.
    - ✓ **Sequential Interdependence** occurs when the output of one unit is the input to another. For eg, the painting & finishing department depends on outputs from component assembly.
    - ✓ **Reciprocal Interdependence** occurs when the output of each unit becomes the input for the other. For eg, a student depends on the professor to explain concepts in class so that h/she can do her assignment.

The type of interdependence affects the amount of power one unit has in the organization. In designing an organization or modifying the design (for eg, through the development of a new IS), various interdependencies must be coordinated. The easiest type of interdependence to handle is pooled, the next hardest is sequential and the most difficult is reciprocal.

ORGANIZATIONAL FLEXIBILITY: Flexibility is the ability to adapt when confronted with new circumstances. A flexible organization defends quickly against threats and moves rapidly to take advantage of opportunities. Flexibility provides the

Ryan Chopra

organization with the ability to adapt to change and respond quickly to market forces and uncertainty in its environment. Technology speeds up the pace of work. It has speeded up order routing and processing on the stock exchange. Technology has made it much faster to search a library book catalog, to communicate with someone at a remote location. Technology can also be used to shorten product development cycles. In general, technology increases the capacity of the organization to process information. IT also alters the space and time boundaries of work. Using E-Mail and computer conferencing, colleagues working on a project do not have to be in the same physical location. Even people who work together in the same office can communicate easily if traveling. With a portable computer and modem, you can conduct some kinds of business from virtually any location at any time of the day or night. Thus, we see that technology has the ability to change the pace of work. These impacts of technology can be viewed as increasing organizational flexibility. With properly designed systems, the organization can increase its ability to respond to customers, competitors and the environment in general. The airline Computerized Reservation Systems (CRS) is an example of flexibility.

IT runs the airline: The difference in service is incredible when the CRSs are compared with their predecessor manual system. In other words, CRS removes the boundary of manual centralized processing. In terms of time and space, you could make a confirmed reservation instantaneously any time of the day or night from virtually any place in the world. Hence, the boundaries in time and space in making a reservation have changed as has the entire process of booking a flight and boarding a plane. Moreover, service is speeded up and is more convenient. The computerized airline reservation systems maintain a large database that contains the names of passengers associated with their flights. Once a reservation has been made, he or she could have the ticket printed. Today airlines offer E-tickets also. The features of these systems contributed to their secondary impact: a competitive advantage based on customer service. Airlines with reservation systems could provide better service to their customers. Using their reservation system as a base, airlines have added many functions ranging from meeting special dietary requests to balancing the loading of the aircraft. The airline CRs

Ryona Chopra

provide flexibility for the airlines, travel agents and travelers. Technology has affected managing of passengers from reservation to flight completion. They could also better manage the airline because they had historical data on reservations and boardings.

Q19. How can we create new types of organizations?

Ans. Technology makes it possible to create new forms of organizations through the use of different design variables (it is something that takes on different values). For organizations, we have design variables like the span of control, a number that can take on different values. An organization that has chosen a span of control of 7 subordinates for each manager will be hierarchical while one that chooses a span of 20 will be much flatter. There are key organization design variables that you can use to build organizations. IT design variables is defined to include computers, communications, video conferencing, artificial intelligence (AI), virtual reality, fax, cellular and wireless phones and pagers, etc. The problem with conventional organization design literature is its failure to recognize the new design variables enabled by IT. In the case of linking mechanisms, IT such as e-mail or groupware can be used instead of conventional solutions such as task forces or liaison agents. The new IT-enabled variables may be totally distinct from traditional design variables. IT-enabled variables may also be an extension of traditional variables, as in the case of linking mechanisms.. Conventional design variables are grouped into 4 categories: structural, work process, communications and interorganizational. There is no specific IT variable next to the traditional variable "control mechanisms." Firms have used ISs to provide control after the organization has been designed. Examples include budgets, project management applications and similar monitoring systems. The variables can be used to create the T-Form (technology form) organization.

Ryohma Chopra

1. STRUCTURAL:

VIRTUAL COMPONENTS: The organization can use IT to create components that do not exist in conventional form. For eg, some manufacturers want parts suppliers to "substitute" for their inventory. The supplier is linked through EDI

with the manufacturer. The manufacturer now has a virtual raw materials inventory owned by the supplier until it arrives for production.

ELECTRONIC LINKING: Through E-mail, electronic or video conferencing and fax, it is possible to form links within and across all organizational boundaries. New workgroups form quickly and easily. It also facilitates monitoring and coordination, especially from remote locations.

TECHNOLOGICAL LEVELING: IT can substitute for layers of management and for a number of management tasks. In some bureaucratic organizations, layers of management exist to look at, edit and approve messages that flow from the layer below them to the level above. Electronic communications can eliminate some of these layers, leveling it in the process. In addition, a manager's span of control can be increased since electronic communications can be more efficient than phone or personal contact for certain kinds of tasks, particularly those dealing with administrative matters. Thus, Technology makes it possible to increase the span of control.

2. WORK PROCESS:

PRODUCTION AUTOMATION: IT is used to automate manufacturing processes. IT is used extensively for automating information processing and assembly line tasks in the financial industry.

ELECTRONIC WORKFLOWS: As organizations eliminate paper and perform most of their processing using electronic forms and images, workflow languages will be used to route documents electronically to individuals and workgroups that need access to them. Agents that can traverse networks to find information and carry messages will facilitate electronic workflows. Electronic workflows also contribute to the monitoring and coordination of work.

3. COMMUNICATIONS:

ELECTRONIC COMMUNICATIONS: E-mail, electronic bulletin boards and fax all offer alternatives to formal channels of communications.

TECHNOLOGICAL MATRIXING: Through the use of E-mail, video and electronic conferencing and fax, matrix organizations can be created at will. For eg, a

Rohina Chopra

company could form a temporary task force from marketing, sales and production using E-mail and groupware to prepare for a trade show; participants would report electronically to their departmental supervisors and to the team leader for the show, creating a matrix organization based on technology.

4. INTERORGANIZATIONAL RELATIONS:

ELECTRONIC CUSTOMER/SUPPLIER RELATIONSHIPS: Companies and industries are rapidly adopting EDI, Internet and Intranet technologies to speed the ordering process and improve accuracy. These technologies help the organization monitor and coordinate relationships with other organizations, for eg, firms acting as virtual components.

Examples of Designs Using IT Variables: In addition to the T-Form, it is possible to characterize 4 new organization structures that make use of the IT design variables. These prototypes show a mixture of conventional and IT design variables and suggest some of the rich organization forms that will appear in the future. In some cases the IT variable has a substitution effect for traditional elements; in other cases it is necessary for the very existence of an organization form. In certain instances, the IT variable is optional or not applicable (NA). Conventional organizations have historically grouped workers together to establish communications and coordination.

VIRTUAL ORGANIZATION: In contrast to physical presence, IT design variables allow for virtual organization structures. It started 15 to 20 years ago as people began to see the possibilities of using technology for work at home. With electronic communications a physical organization is not needed for many kinds of tasks. For eg, many catalog operations use individuals working from their homes using a phone. The virtual organization creates new management and coordination challenges. The kind of virtual office described above may be necessary to assuage a manager's misgivings about supervision. Perhaps all members of this non-organization will log in to virtual offices each morning to report in and have an electronic discussion with a supervisor. Microsoft offers Net-meeting on its network which makes it possible to coordinate work on PCs in different locations. CU-SeeMe is a program developed at Cornell. It is free and lets

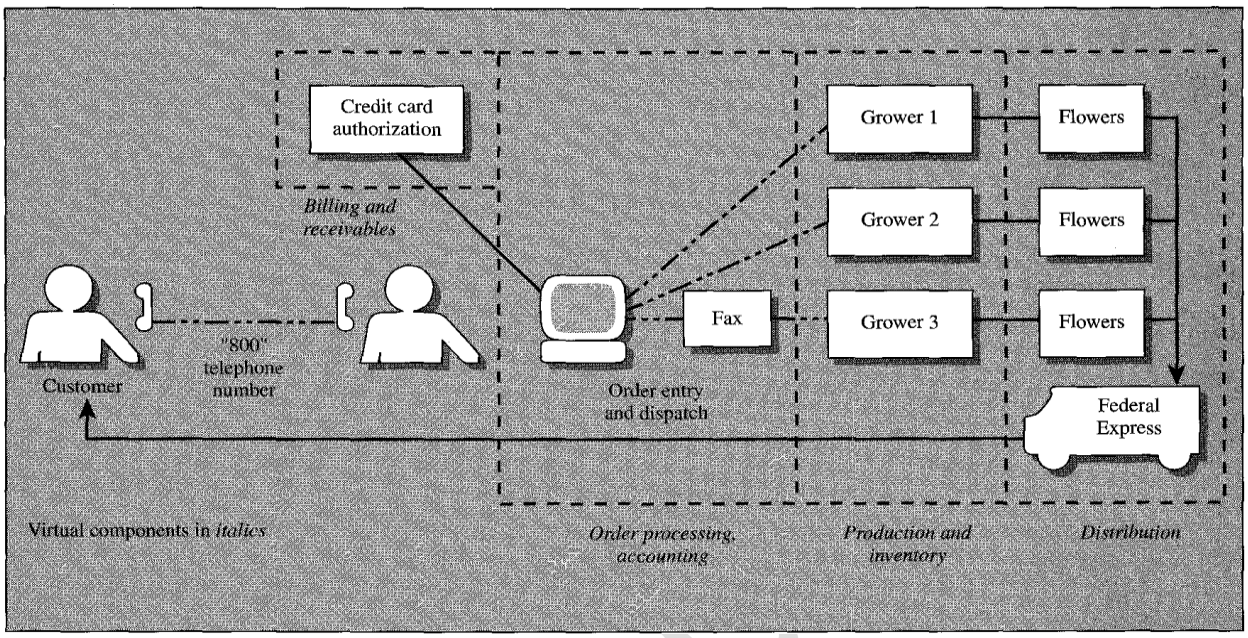
Rychna Chopra

users on the Internet set up small videoconferences using inexpensive cameras. At first, only technology companies like IBM and AT&T eliminated employee offices. AT&T found that eliminating commute time with a home office allowed the sales force to spend 15 to 20% more time with customers. Now, other firms like Chiat-Day, an advertising firm, have eliminated physical offices for a large number of employees. When Compaq Computer Corporation moved its sales force into home offices, sales and administrative expenses went from 22% to 12% of revenue partially due to this change. Perkin-Elmer, a scientific equipment manufacturer in Connecticut, based 300 sales and customer-service representatives in their homes, which allowed it to close 35 branch offices.

NEGOTIATED ORGANIZATION: A second kind of IT-enabled organization is labeled negotiated agreement. A flower company in California, Calyx & Corolla, is based on 2 negotiated agreements. The 1st agreement is with Federal Express to deliver flowers overnight to any destination in the US at a favorable rate. The 2nd agreement is with flower growers. Instead of selling exclusively to wholesalers, the growers agree to put together a number of standard arrangements. The final part of the organization is an 800 number staffed by clerks who take orders. The orders are sent via phone or fax to growers who prepare and address arrangements for pickup and delivery by Federal Express. Through these negotiated agreements and communications technology, this company feels it can compete with the neighborhood florist. Calyx & Corolla is a negotiated organization in that its existence and profitability depend on the agreements it has with others and the service supplied to its customers by others. Calyx & Corolla is, in effect, a broker using IT to coordinate its negotiated production facility and its negotiated delivery system. The management challenge for the negotiated organization is to maintain service and quality. The firm depends on its partners to provide a product or service and yet has limited direct supervision of the business. Meeting service targets and deadlines and assuring adequate quality control can be difficult. As an example, the floral firm might place random orders with its growers to have flowers sent to its own management to test delivery time and product quality. Just as department stores have used "shoppers" to test their own personnel and service, and to check on competition, the negotiated

Rohina Chopra

organization will need "electronic shoppers“. An alliance that creates virtual components results in ongoing interdependence between the 2 partners.



TRADITIONAL ORGANIZATION: Traditional organizations are also using technology to make some changes in structure without making major modifications to the entire organization. An electronics manufacturer has set up a just-in-time EDI link with a parts supplier, changing one component of the organization; the supplier can now be viewed as part of the manufacturer's raw material inventory. They may call its redesign efforts "reengineering” whose objective is to make dramatic improvements in how an organization functions. For eg, a company completely redesigned the way it processes physical securities turned over by customers. This effort resulted in the closing of 2 processing centers and the creation of a new processing site. The firm adopted image processing to dramatically reduce the need to physically handle securities. In this process redesign, the total number of individuals employed in handling securities has been cut by 50%. Finally, with the process running smoothly, they outsourced its operations and systems to a 3rd party. There are many examples of the use of IT design variables to make changes in parts of traditional organizations. A management challenge in the traditional organization is to transform the organization enough so it can take advantage of the cost savings and competitive

opportunities made possible by technology. Today's business environment is characterized by rapid changes and the traditional organization needs to take advantage of technological leveling to reduce layers of management, technological matrixing to improve coordination and electronic workflows to reduce paper handling. The traditional organization today is at risk unless it progresses toward the virtual model & the T-Form to improve responsiveness. IBM, one of the largest and most admired "blue chips" in the 1960s and 1970s, struggled for a number of years with declining market share and bureaucracies that resisted the kind of sweeping changes necessary to be competitive. IT organization design variables help restructure traditional organizations by making them more flexible. However, bringing about the kinds of changes that are possible given the technology is a formidable management task not well suited to the traditional organization.

VERTICALLY INTEGRATED CONGLOMERATE: We labeled the last IT-enabled organization prototype a vertically integrated conglomerate. The movement toward greater electronic exchange of data between customers and suppliers creates vertically integrated conglomerates. This form will more likely emerge if there is a large power imbalance between the customer and the supplier. As an example, General Motors (GM) requires all its suppliers to use EDI. For some suppliers, GM is such a large proportion of their business that the supplier becomes a component of GM, responding to its orders and demands. GM sends orders to the supplier's production-scheduling system and is permitted to modify production schedules, priorities, etc. As a result, GM obtains a substantial amount of control and can sever the relationship at any time for little or no investment. It may not be desirable for all organizations. Managers must be careful when establishing electronic links. The efficiency is very appealing, but the link may lock a firm into a relationship that reduces its independence. Until the links are standardized-for eg, using an industry standard or an X.12 EDI protocol-firms involved have more flexibility in switching business relationships.

ADDING PEOPLE TO THE DESIGN: The design remains neutral as its focus is on creating an efficient and competitive organization. People and tasks are an important component of any organization in addition to structure and

Rytonia Chopra

technology. The beliefs of senior managers are likely to determine the direction of the firm, its strategy and how resources are allocated. It may be difficult to change an organization if one only attempts to alter its structure. People and tasks may create the greatest challenge for the manager who wants to change the organization. In a rigidly hierarchical organization, tasks are separated and decision making is done within strict guidelines. Tasks are defined by rules and practice to avoid risk. Bureaucracies assume employees need to be motivated so they provide elaborate standards and procedures to tell them how to do a job. A professional services firm is based on trust and professional conduct. For eg, members of law and consulting firms tend to define their own tasks. The virtual organization has to be based on trust and minimal supervision. We expect that this type of organization will be more common in the future as a number of forces, from child care to clean air, argue for fewer, centralized workplaces to eliminate unnecessary commuting. In a negotiated organization, one must trust employees who are in allied companies. An agreement may specify the required output or level of service, but it will be up to each member of the alliance to accomplish its tasks as it sees fit. The traditional firm with electronic components tends to be large & will treat its employees in a variety of ways. Technology can be used to distribute responsibility to lower-level managers or to centralize control over the organization. This structure depends on the firm's assumptions about employees and how it defines tasks, especially decision making. The vertically integrated electronic conglomerate is very control-oriented as it drives the systems of a different organization; it avoids the expense, the need for, and the risks of traditional vertical integration. As a result, it tends to specify clearly how the firms connected to it electronically must operate.

Q20. Explain “IT and Corporate strategy”?

Ans. A firm can continue its present course, maintaining momentum where it is doing well. Alternatively, the corporation can dramatically change its strategy by deciding among competing alternatives for new ventures. What is the role of technology in its strategy? IT and strategy become intertwined, with each influencing the other. A well-managed firm will strive for this kind of integration. A key task of top management is formulating corporate strategy. What

Rydhima Chopra

opportunities for new directions are available? What are competitors doing? The examples illustrates how the integration of information-processing technology with strategy formulation expanded the opportunities for each firm.

Example 1 of Technology & Strategy: Merrill Lynch is the largest stockbrokerage firm in the US and plans to become one of the major financial institutions in the world. Two decades ago, funds in a customer's brokerage account earned no interest. There could be cash in such an account because of the sale of stock or because of dividends on stock held by Merrill Lynch for the client. The firm developed a new financial product called the Cash Management Account (CMA). At the time the product was conceived, interest rates were extremely high and a number of small investors were keeping their funds in liquid assets accounts. These funds buy and sold large securities with a value of $100,000 or more. The investor buys shares, usually with a par value of $1. The account requires a minimum deposit, possibly as low as a few thousand dollars. The funds keep the value of the ownership units at $1 by varying the dividends and buying short-term securities. Now the small investor, instead of being limited to bank or Savings & Loan(S&L) passbook accounts, can take advantage of higher interest rates previously available only to those with a large amount to invest. (Today banks and S&Ls are able to offer money market accounts, but they were not available at the time Merrill Lynch developed its new account.) The firm decided an account that automatically invested idle cash in Merrill Lynch's own Ready Assets (liquid assets) Fund would appeal to its customers. In fact, the CMA is like a bank account and brokerage account combined. The customer can write checks against the account and even receive a bank charge card. At first the account was slow to win acceptance, but today Merrill Lynch has more than a million CMA customers. Other brokerage firms have hired Merrill Lynch employees to develop similar products. Merrill Lynch patented the account and asked for licensing fees from other brokers. In an out-of-court settlement, another brokerage firm agreed to pay $1 million for hiring a Merrill Lynch employee to set up a similar system. Merrill Lynch gained a significant competitive advantage with its CMA system.This system have developed with confidence in IT. With a million accounts to update, the magnitude of the catastrophe if computer systems do not work is hard to

Rylonna Chopra

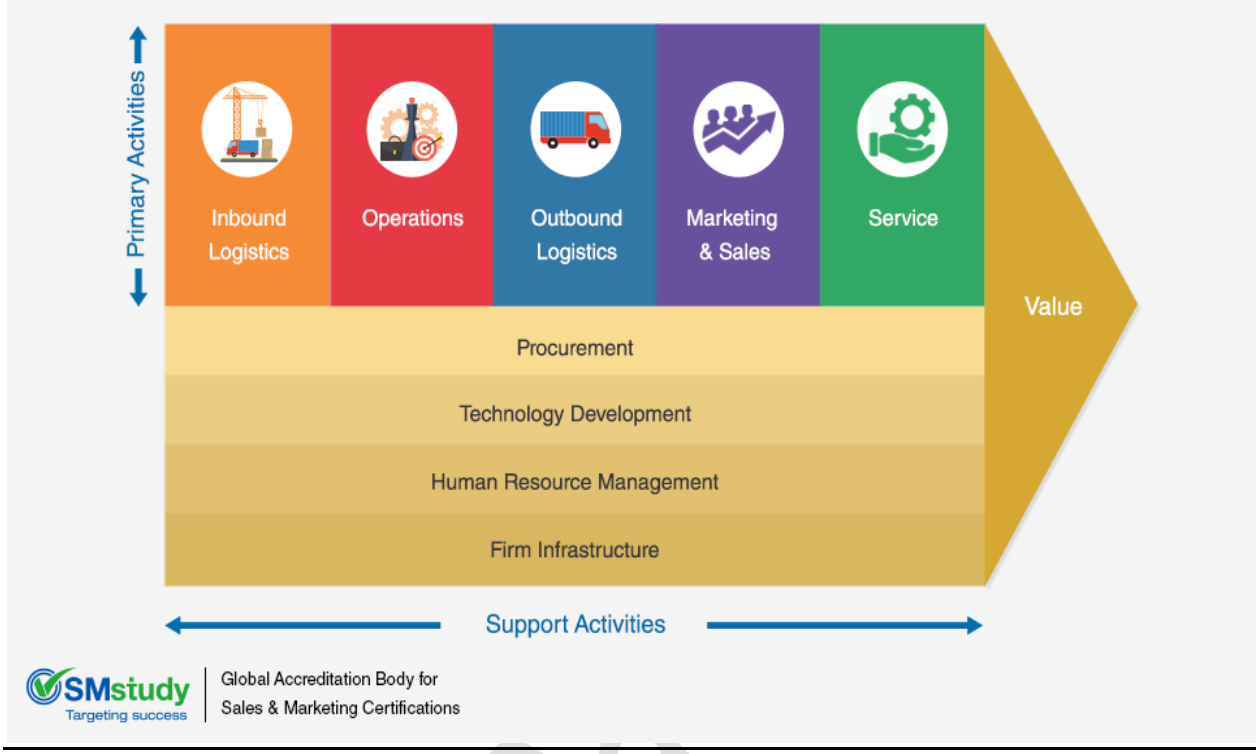
imagine. In fact, this product could never be offered unless a firm had computer technology and could manage it. The volume of updating and the short time requirements would be just too great for a manual system.

Example 2 of Technology and Strategy: On a smaller scale, information processing technology made it possible for a new market research firm to offer a service it could not obtain from its competitors. The company developed a strategy that is intertwined with IT. The firm purchased grocery store point-of-sale scanning equipment and at first, gave it free to 15 supermarkets in 2 towns selected on the basis of their demographic makeup. There are 2000 households in each of the 2 test markets using the scanning equipment and purchases are recorded on the firm's computer in Chicago. Since each product is marked with the universal product code, researchers can pinpoint a family's purchases by price, brand and quantity, and then correlate the purchase information with promotions such as coupons, free samples, price adjustments, advertising and store displays. With this technology the company can conduct careful, scientific tests of marketing strategies to determine the most effective approach for its customers. For eg, through cooperation with a cable TV network, the firm can target different TV commercials to selected households and analyze the resulting purchases. The imaginative use of the technology has allowed the firm to gain a competitive lead over much larger, more well-established market research firms. This firm has grown and recently was able to sell the software it developed for analyzing scanner data for a premium price.

THE VALUE CHAIN: Michael Porter at Harvard has popularized the concept of the "value chain," the activities in an organization that add value to its products or services. The primary activities in the value chain include inbound logistics, operations outbound logistics, marketing and sales, and service. Each of these activities adds value directly to the firm's output. Supporting these primary activities are the firm's infrastructure, human resource management, technology development and procurement. IT can & does have a profound impact on the value chain. Consider Calyx & Corolla: Growers provide inbound logistics and FedEx is responsible for outbound logistics. Two alliance partners, linked by

Rohini Chopra

electronic communications in the case of growers, provide important components of the primary value chain.



Some Generic Strategies: Porter elaborates on his value chain analysis and suggests that firms follow one of 3 generic strategies:

1. **LOW-COST PRODUCER:** Here the firm tries to have the lowest costs in the industry so that it can compete on price.
2. **DIFFERENTIATION:** The firm tries to separate its product image from that of the competition in such a way that the customer wants its product. Luxury automobile manufacturers like BMW are very adept at differentiating their products from other cars. For example, if you buy a BMW, you are said to have "the ultimate driving machine.“
3. **MARKET NICHE STRATEGY:** A number of firms try to find a market niche and exploit it. A niche is some part of a market that is not being served by others. Hermes has stayed in its niche of producing high-quality, expensive products like women's scarves for a limited clientele.

In today's competitive economy, we have observed firms focusing on more specific strategies that are listed below. Most of the time, the firm adopts only one of these, but it is possible to follow 2 at the same time:

- ✓ **CUSTOMER DRIVEN**: Here the firm focuses on its customers. How can we provide better customer service? How can we design products that meet our customer's needs? What technology exists so we can better serve our customers? Customer service is extremely important in commodity businesses.
- ✓ **REDUCING CYCLE TIMES**: A firm has a variety of cycle times; a typical one is the length of time it takes to design a new product or service. Detroit automobile manufacturers and Boeing are focusing on reducing cycle times. They now use parallel design and engineering where tasks are done simultaneously rather than sequentially. In addition to saving time, parallel development results in better coordination among team members working on the design of a new car or plane.
- ✓ **GLOBAL COMPETITION:** As the unification of Western Europe continues and Asian economies become more open, some firms have decided to follow a strategy of competing in the global marketplace rather than only in local markets . A firm with global presence will need a variety of technologies to help coordinate and control all its activities. IT is a great facilitator for global operations.
- ✓ **RIGHT-SIZING:** In the U.S., the first part of the 1980s was an economic boom, leading to a number of excesses. The late 1980s and the 1990s were marked by economic downturns and slow growth. To compete in a difficult economy, firms have attempted to determine their "right size." Usually to right-size meant a serious reduction in the number of workers in the firm and rather large write-offs for restructuring. Blue-chip companies such as IBM have reduced their levels of employment by tens of thousands of workers.
- ✓ **QUALITY:** Japanese manufacturers gained a large market share in a number of industries partially through a fanatical devotion to quality. Many firms around the world are focusing on quality in the hopes of getting ahead of the competition. Quality is an obvious component in the manufacturing sector, but the services firm can also be concerned about the quality of its output.

A Framework for the Strategic Use of IT: Figure shows a framework for IT strategy that arrays a firm's existing applications against those that are currently under development. The framework in Figure is a useful one for diagnosing the state of an organization. We can look at the nature of the business, its plans for the future and its existing and planned applications. Those authors concerned with the use of IT as a part of corporate strategy have all taken a slightly different approach to classifying systems. One common thread seems to run throughout

Rohini Singh

the discussions: Technology can contribute to a firm's strategy in a number of ways. It can reduce costs to help an efficient firm compete & technology can tie the firm more closely to suppliers and customers. The technology can also become a product itself, such as the Merrill Lynch's CMA or an airline's CRS. Both of these allowed firms to gain a significant competitive edge.

ISs Strategic grid

Companies that are located in the **strategic** cell are critically dependent on the smooth functioning of ISs. These firms need significant amounts of planning and would be at a considerable disadvantage if information processing did not perform properly. In this cell, management is already aware of the importance of technology to the firm. The authors found one bank that fit this cell well. Without computers, the bank would be awash in a sea of paper and could not possibly keep up with the volume. The bank must think of how to use its systems strategically to offer services that will let it capture a greater market share. For instance, banks are offering new services connecting home computers to bank computers.

In a **turnaround** company, there is a need for planning too. It is likely that corporate performance is inhibited by poor performance in the information-processing department. Applegate and her colleagues found a firm in this cell with adequate operating systems in production but limited new applications critical for keeping up with growth. Without new technology the firm could not maintain control over its rapidly expanding operations. In a turnaround situation, we may want to emphasize to management the importance of leading the ISs effort.

The authors argue that in the **factory** setting, there is not much to do but run existing applications. They maintain that strategic goal setting and linkage of ISs to the corporate plan are not too important here.

Finally, in a **support** environment, information processing is probably not critical to the firm, so strategic integration will not be essential for success. The authors expect to find low levels of senior management involvement in this situation. This is the position of Applegate, McFarlan and McKenney who argue that in the support cell, it is quite appropriate for management to be relatively uninvolved in information processing. Although this may be true for certain systems, the advice is bad in general because it encourages management to ignore IT and the new opportunities it provides. It is quite possible that a firm in the support cell will be able to come up with a strategic application that allows it to gain a competitive edge. In fact, if the support cell position is characteristic of the industry, the firm that first finds a strategic edge through IT may in fact move far ahead of the competition.

Capitalizing on IT: There are 4 steps to be followed by top management of a firm to take advantage of information:

1. **Look for ways to incorporate technology in a product or service:** Does information processing provide an opportunity for a new approach to business? Does the technology make it possible to differentiate a product or service from that of the competition? Technology can help open a new market or increase an existing market share.
2. **Seek ways to use technology to connect with other firms:** There is great interest in interorganizational systems that link 2 organizations together.

Rydhima Chopra

Your firm may be able to connect electronically to its customers so that it is easy for them to order from you. A firm can encourage its suppliers to provide links for placing orders. In these instances, the firms in question are drawn more closely together, making it difficult for the competition. These links include the Internet, which is becoming the connection mechanism of choice among firms**.**

3. **Look for ways to use technology to make dramatic changes in the way you structure the organization**: Use IT organization design variables so management can structure an organization that is highly competitive, that uses its technologically enabled structure to become a formidable competitor. IT based structures that focus on one of the strategies described earlier, for eg, providing extraordinary customer service, can also provide an advantage.
4. **Integrate technology with planning:** To integrate technology with planning, managers have to understand the operation of their business & the capabilities of technology. In addition, the firm has to have invested in building a modern technological infrastructure so that it is ready to take advantage of new opportunities. Finally, management has to make IT a part of its planning process. One of the greatest impediments to using IT for strategic purposes is an inability on the part of top management to successfully manage the ISs function. If executives do not believe they can control information processing services, they probably will be unwilling to rely on this technology to accomplish strategic goals**.**

Q21. What do you mean by creating & sustaining a competitive edge?

Ans. USING RESOURCES TO ADVANTAGE: Theories by Teece and Barney apply well to the case of using IT for achieving a competitive advantage. A firm has a number of resources available to it including its employees and their knowledge, capital, products and services and physical resources that may include a significant investment in a production facility. Some of these resources are likely to give a firm a strategic advantage. Resources, according to Barney must be valuable, rare, imperfectly inimitable and non substitutable to provide an advantage. Otherwise a competitor can develop exactly the same resource without much cost and duplicate your firm's strategy. A resource must be valuable enough that a competitor will think twice before trying to acquire or create a copy. A **rare** resource is more difficult for a competitor to acquire or copy. A strategic resource has to be **imperfectly inimitable** as well to deter

Rohini Gupta

creating a direct imitation. A resource has to be **non substitutable** so that a competitor cannot find an easy substitute in the form of a different, more accessible resource that is easy to acquire. Intel is an example of a company with resources that give it a competitive advantage. First, it has the knowledge of how to build and produce complex logic chips; Intel regards its ability to build and run a chip fabrication plant as a major competitive advantage. It has the knowledge and engineering resources to create and operate these plants that cost in excess of $1 billion. Intel is also large enough to have the financial resources to build such expensive plants. This combination of resources is valuable, rare, imperfectly inimitable and non substitutable.

Protecting an IT Innovation: Many innovations in IT are virtually impossible to protect from copying. It is difficult to copyright or obtain a patent on an application of technology. When FedEx established a Web site to let customers inquire about the status of their shipments, United Parcel followed with a similar Web service within a month. The term "regimes of appropriability" is sometimes used to describe how easy it is to protect an innovation. A strong regime means you can protect an innovation, while weak appropriability means that others can easily duplicate your innovation. There may be ways to use the technology, itself, to strengthen your regime of appropriability. Most IT initiatives seem to have weak appropriability regimes. While a firm may have the appropriate resources to create an innovation, it can be difficult or impossible to sustain it . There are, however, some conditions that favor the innovator. For eg, if you have certain complementary assets (resources) that are unavailable to others, you may be able to protect your innovation. When IBM brought out its first PC in 1981, it had a strong complementary asset in the form of a marketing organization with contacts in major corporations around the world. A co specialized asset is one that has mutual dependency with the innovation. A good example of a co specialized asset is the relationship between Microsoft's Internet Explorer and Windows 98. The Explorer depends on Windows since it must run on a computer controlled by this OS as the Explorer interface becomes a part of Windows, the OS develops a dependence on this browser. One of the most popular ways to sustain an advantage is to be the first mover. The first mover may be able to create an

Rohina Chopra

insurmountable lead over the competition. Merrill Lynch has many imitators; in fact the "sweep account" is very common in the investment business. However, no one has been able to overtake Merrill Lynch's lead; it has by far the largest number of CMAs of any other brokerage firm. Another way to sustain an advantage is to overwhelm the competition with technological leadership. United and American airlines have more than 70% of the domestic market for reservation systems in travel agencies. These firms had the resources to make large investments in technology and for developing skilled staff members who could implement reservation systems. The companies applied their resources to create the CRSs in the first place and the CRSs themselves became resources for competing. Apollo and SABRE today are travel supermarkets that would be extremely difficult and expensive to imitate. By continuously investing in technology and managing it well, these 2 airlines provide significant barriers to entry for other airlines and vendors of potential reservation systems. Closely related to technological leadership is continuous innovation. Successful strategic applications such as the classic American Hospital Supply/Baxter Health Care order entry system demonstrate continuous innovation. Today, with this system, Allegiance, a Baxter spin-off now a part of Cardinal Health Care, offers a service that is the virtual inventory for a "stockless" hospital. IT and a superb logistics system let Allegiance promise just-in-time deliveries to different departments in a hospital. A final approach to sustaining an advantage is to create high switching costs. By making it very expensive or inconvenient to switch a customer's business to a competitor, you are assured that customers will continue to do business with you. The airline CRS vendors have been very clever at locking in travel agencies. At this time, almost all agencies in the U.S. are automated. Increases in the number of customers and market share only come from converting an agency from a competitor's CRS to your own. Each CRS vendor has created very high switching costs for an agency to convert to a competitor's CRS. Simply finding a strategic application of technology abd implementing it successfully are not enough. This approach should provide a short-term competitive advantage, but the innovator must constantly be searching for ways to sustain an advantage as the competition tries to imitate its success. When planning and developing a strategy, think about the kinds of resources you have to provide an advantage and the difficulties of

Rydhima Chopra

protecting an IT innovation. Do you have specialized or co specialized assets to enhance the innovation? Can you turn the IT innovation into a resource, itself, that is valuable, rare, inimitable and non substitutable through some combination of being the first mover, technological leader, continuous innovator, and/or the creator of high switching costs?

An example of technology for competitive advantage: Clemons and Row describe how a small travel agency expanded to a nationwide business through the use of IT. Rosenbluth Travel, headquartered in Philadelphia, grew from $40 million in sales in 1980 to $1.3 billion in 1990. It is now one of the 5 largest travel management companies in the US and has more than 400 offices. According to the authors, Rosenbluth was extremely effective in taking advantage of the opportunities offered by deregulation in the travel industry. The firm has used technology to help manage the complexity of modern travel and to obtain economies of scale. Rosenbluth invested in IT over a period of years. While the expenditure in any one year was not inordinate, Rosenbluth created a technology base that is extremely difficult for a new entrant or even a competitor to match. Prior to deregulation in 1976, travel agents wrote about 40% of all tickets. The role of the agent was only to make a reservation and distribute a ticket. Deregulation changed the role of travel agents. American Airline's SABRE system contains more than 50 million fares and processes 40 million changes a month. The airline reservation systems used by travel agents were biased toward the airlines, though no more so than one would find calling the airline itself for information. The travel agent, however, could be expected to help the client without a bias toward a particular airline. By 1985 travel agencies were distributing more than 80% of air tickets. Businesses are very interested in managing their travel. It is the 3rd largest expense for most firms after payroll & IT. Firms began to negotiate rates with airlines, hotels & rental-car companies. One of Rosenbluth's major business focuses has been the corporate travel market. In about 1981 the firm experimented with processing data from airline CRSs to provide information for corporate accounts. In 1983 Rosenbluth introduced a product called READOUT that listed flights by fare instead of by time of departure. This program made it possible to see the fare implications of taking

Rohina Chopra

a particular flight. The normal flight display was by departure time, and the agent had to move to another screen to obtain fare information.

In 1986 a proprietary back-office system, VISION, created a highly flexible reporting system for clients. The system created a record of transactions made for a client at the time of ticketing regardless of the location of the agency or the CRS in use. This system gave Rosenbluth independence from the data provided by the airline CRS. During 1986 Rosenbluth estimated that it invested nearly half of its pretax profit in the system. The VISION system was more flexible and produced reports about months earlier than agencies using only the airline CRS. Rosenbluth used VISION to negotiate special fares with the airlines on heavily traveled routes the system identified. Instead of competing for corporate clients by offering to rebate part of its commissions, Rosenbluth tried to create a cooperative relationship with clients. It promised clients to reduce overall travel costs through lower fares and used VISION reports to document the savings. In 1988 Rosenbluth used a new feature in United's Apollo reservation system to support intelligent workstations. PRECISION, the new Rosenbluth system, made client and individual employee travel profiles, and READOUT, the database of flights listed by increasing fares, were made available to the booking agent. ULTRA VISION was another system that ran with the normal reservation process, monitoring transactions for accuracy and completeness.

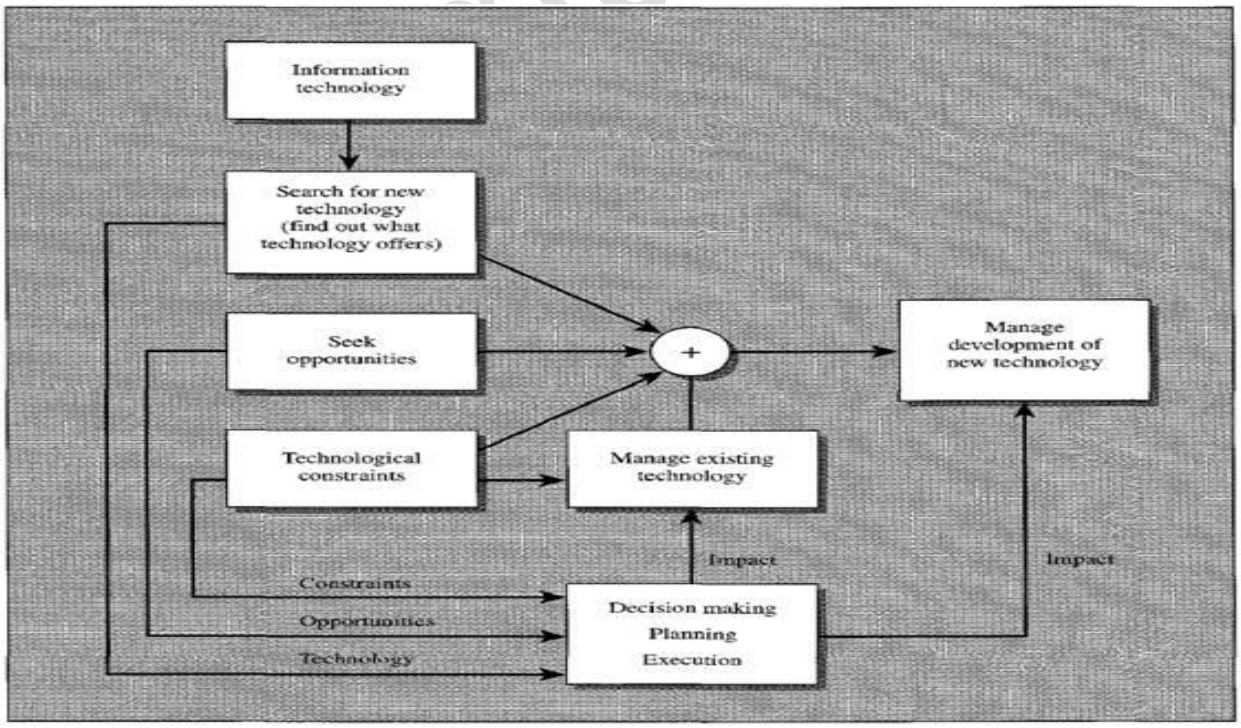
During 1990-91, Rosenbluth began installing USER VISION in its offices. This system lets the user make flexible queries about corporate travel. The data are one day old compared to the 45-day lag typical of the airline CRS data. These initiatives were part of a tremendous growth period as Rosenbluth's sales increased from $400 million in 1987 to $1.3 billion in 1990 while the number of offices increased from 85 to over 400. The firm has been extremely successful. Business and technology strategy were developed together in an integrated approach to growth. The firm took risks in developing new uses of IT and in-house expertise to successfully implement systems. Rosenbluth's technology strategy competes through value-added services rather than being the low-cost producer through rebates. It also took advantage of technology to market new services to

Rydhima Chopra

its clients. The company meets jointly with its clients and service providers to help the client negotiate the lowest possible fares.

Q22. Explain integrating technology woth the business environment?

Ans. One of the most significant management challenges during the coming decade will be to integrate business and technology. Managers must consider how technology affects their decisions and how their decisions affect the technology. Figure describes how a manager can integrate technology with decision making. First, the manager has to search for new technology to help create new business opportunities. These opportunities, combined with the technology itself, lead to new development projects. The development projects are influenced by technological constraints. The firm cannot undertake a new marketing program in which customers inquire about their orders from the Internet if the firm lacks the skills to set up a home page in the WWW and integrate the page with its existing order-entry system. Therefore, a firm cannot provide customers with inquiry capabilities until it allocates resources to develop a Web site.

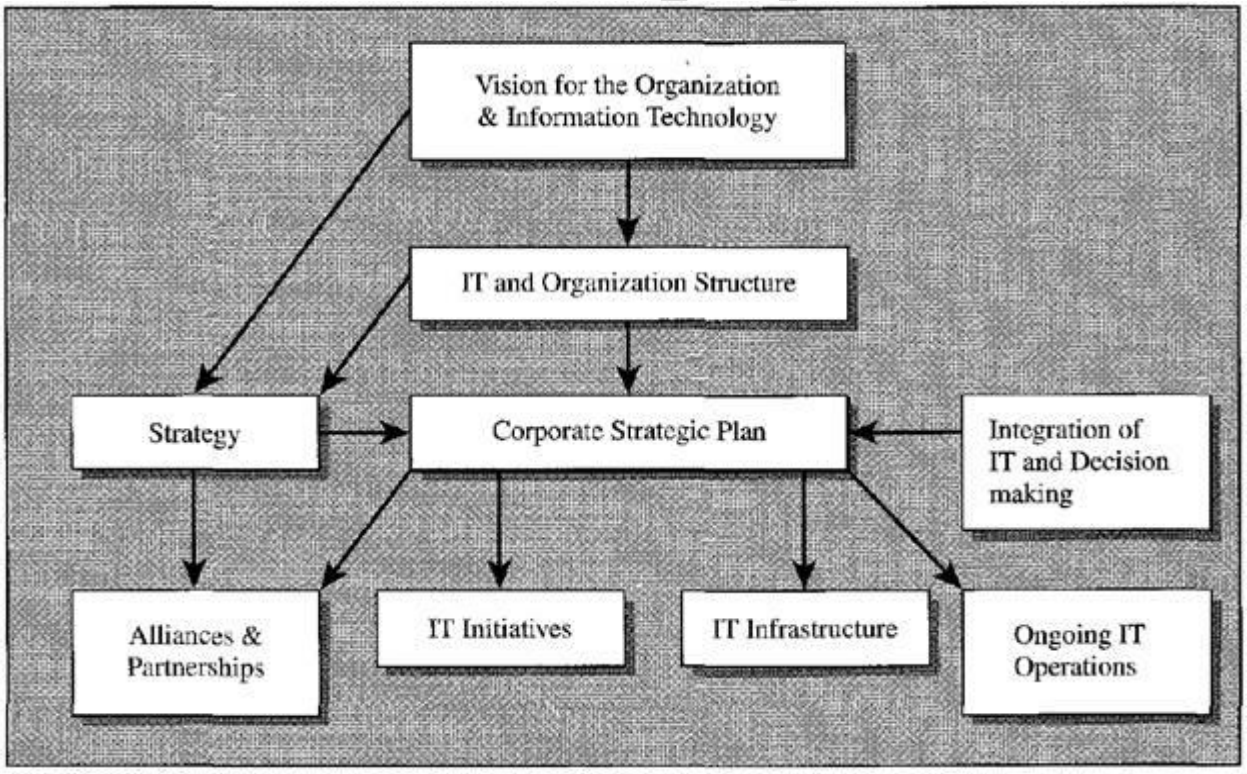


The management challenge of integrating IT

The box at the bottom of Figure represents decision making, planning and execution of decisions. Technological constraints and opportunities influence these decision-making activities. Management's decisions influence how it manages the existing business and technology. A decision to undertake a major factory automation project will result in a different type of production process to manage. Successful managers must be able to integrate their knowledge of IT and their business knowledge in making decisions. The manager should be aware of the opportunities provided by the technology and the constraints that already exist for the firm in developing new technologies. The manager should also recognize that as decisions are made, the alternatives chosen will have an impact on technology and its development within the firm.

Q23. What is managing IT?

Ans.



A framework for managing IT

The arrows in the figure show the relationship between actions in the boxes for managing and controlling technology. The 1st step is to develop a vision for the organization and IT. Next the senior manager looks at how technology can contribute to the structure of the organization using the IT design variables. The structure of the organization is influenced by corporate strategy. Strategy, structure and the integration of IT into the firm help generate a plan for technology. This plan includes a structure for the IT subunit(s) in the organization along with a hardware/software/network architecture for the firm. The plan describes what new applications and what resources are needed to operate existing technology. It also describes the sources of services, for eg, from within the firm or from an outside source. Finally, the plan contains information on how management will control the technology effort.

A Vision of the Organization and Technology: Visions are rare and difficult to create; leaders are frequently criticized for lack of vision. For an organization, the vision is important, especially given the ability of technology to change the structure of the firm, the nature of its business and the basis for competition. A fundamental responsibility for management is to develop a vision for the business and for the role of IT in achieving that vision. The vision should describe the mission of the organization and identify the products and services it produces. It should identify the markets in which the firm will compete and its strategy for competition. It plans for mergers, partnerships, alliances and acquisitions are all part of a vision. IT is likely to play an important part in shaping the structure of the organization and in supporting its value chain activities.

Technology for Structuring the Organization: Because a firm's structure is highly interrelated with its strategy, these 2 aspects of the organization must be considered together. For eg, a firm might decide to compete on the basis of extremely efficient operations, to become the low-cost, low-overhead producer in its industry. This firm might use production automation to reduce costs and improve quality. It could use electronic customer-supplier relationships to process electronic orders from customers on a just-in-time basis and to order in a similar manner from its suppliers. The firm could employ technological matrixing to form electronically linked project teams to develop new products and services in

Rohina Chopra

parallel. To minimize overhead, it could employ electronic communications and linking with its sales force, providing them with electronic devices such as notebook computers with fax modems, wireless communications and cellular phones in place of a physical office. Beyond the adoption of a generic strategy such as becoming the low-cost producer, management wants to develop technology that will give the firm a competitive edge. The most difficult part of gaining such an advantage is coming up with an idea. No text can teach creativity or give a formula for it. By reviewing what competitors are doing, staying ahead of the technology and looking for analogies in other industries, you can develop new ideas for strategic advantage. It is likely these strategies will include the development of interorganizational systems and alliances with other firms. For a manufacturing firm, IT strategy might involve technology embedded in a product, such as the computer chips found in automobiles to control the engine and exhaust, antilock brakes, traction control and similar functions. A services firm might look for ways technology can add value to existing services, make it easier to do business with the company, reduce cycle times, lower costs and make the other contributions. You also need to consider an Internet policy and presence on the www.

Integrating Technology and Decision Making: A significant responsibility of management is to integrate technology with all business decisions. Integration means that the manager is aware of how new technology can create opportunities. The technology can literally change the way a firm does business. Concomitantly, the manager has to be aware of the impact of decisions on the firm's technology. A decision to enter a new line of business has a direct effect on existing information-processing systems.

A Corporate Plan for Strategy: A corporate strategic plan comes from the firm's vision for its future activities. This plan includes the vision; it is a road map for bringing about the vision. Rather than a separate plan for information technology, IT should be an integral part of the firm's strategic plan. Given the contents of the corporate strategic plan, it is possible for managers in the IT function to develop a more detailed IT plan to support the corporation. Many organizations agree that a plan is needed yet do not develop one. A frequent reason given is that the 3-to-5-

Rohima Chopra

year ISs planning horizon is not compatible with the planning horizon of the organization. Yet it is both possible and highly desirable to develop an IT; the technology is too pervasive and important for planning to occur by default or solely through decisions made by personnel in the information services department.

Alliances and Partnerships: Companies today form a variety of partnerships and alliances if the IT industry is any example. In fact, firms sometimes form alliances in one area with a company they compete with in some other aspect of business. Intel and Microsoft have a long history of cooperation, but Intel is also working to produce chips that run competing OSs. Honda places a new badge on an Isuzu Rodeo and sells it as a Honda sport-utility vehicle; Acura does the same with an Isuzu Trooper. If another organization has a product or service that enhances your offerings or your operations, it can be very appealing to work with them. IT facilitates these kinds of cooperative arrangements by providing electronic linking and communications.

New IT Initiatives: As technology advances, an organization seems to stimulate new ideas on how to use IT to improve some aspect of it. The corporate strategic plan should identify broad areas in which technology can contribute to the firm. An IT plan adds further details and identifies specific applications of the technology for development. A system that will be feasible can usually be undertaken to improve the organization. A corporate steering committee should choose applications areas as a part of developing a plan for information processing. The task then is to choose what type of system, if any, will be developed. Management must consider the existing portfolio of applications and provide guidance on the amount of investment possible and the balance of the portfolio. Systems development is an area that requires a great deal of management attention. Managers must demonstrate that they are behind the development of a new system and see that there is adequate user input in the design process.

The IT Infrastructure: The combination of the firm's various common technologies constitutes information infrastructure. For eg, the organization

Ryohna Chopra

provides networks to which various computers are connected. It would not make sense for individual users to each develop their own network or choose a different provider of network services. Some experts define the infrastructure as limited to common facilities the firm provides, like a network; this view of infrastructure is similar to that of society at large in which governments provide infrastructure such as roads and airports. Others take a broader view of infrastructure and define it as the firm's existing stock of technology that is available to users. Infrastructure is extremely important because it facilitates the development of new IT initiatives. If you wish to develop an interactive application available to all employees, the time and effort required will vary dramatically depending on whether the firm has an Intranet in place. Frequent group review meetings are important during the design process. Top management must participate in these meetings and make clear that it supports the changes likely to come from the system.

Ongoing Management of IT: Visions and strategy are long term in nature; the firm still faces the day-to-day task of managing IT. This work consists of 2 different kinds of tasks: developing new applications and operating the existing stock of applications. What does operations involve? Consider Morgan Stanley, a leading investment bank and a major force in retail brokerage through its merger with Dean Witter in 1997. The investment bank's technology (without its new acquisition) is a 24-hour-per-day, 7-days a-week operation. There are 15,000 computers used to process 100,000 trades a day. The firm has an estimated 100 million lines of software code and an Intranet with 10,000 users. Each night, its batch-processing cycle executes 34,000 jobs. Morgan Stanley is a services firm and much of its business is information processing. Its "factory" is the IT division, which managers must be sure operates reliably and within deadlines so that the firm is able to "make its products" every day.

Rohina Chopra

UNIT 5

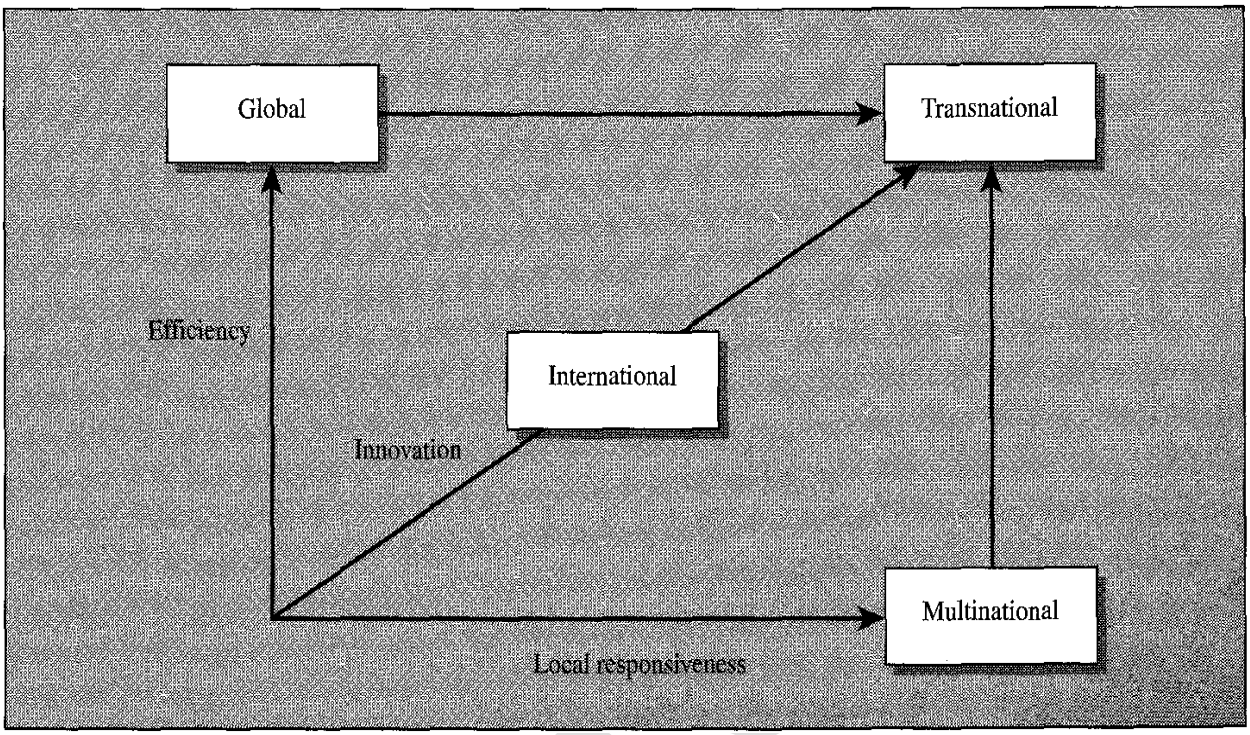
Q24. Explain International business and IT technologies?

Ans. Businesses are turning themselves into global concerns. IT is an important tool in making this transformation and in designing the international organization. As tariffs fall, you can expect to see firms rapidly moving operations to different parts of the world to take advantage of special competencies and disparities in wage rates. Even a one-person company can have worldwide sales through the Internet! One researcher who studies international business suggests that IT is the glue that can hold an international organization together and help coordinate its operations. All of our IT design variables that focus on communications, such as electronic links, technological matrixing, electronic customer/supplier relationships, and virtual components, are available to help manage and coordinate the global firm. Globalization has been one of the major trends in business in the last decade. It is estimated that 579 global corporations account for about 25% of the world's production. These companies range in size from $1 billion to $100 billion. The world's strongest economies are heavily trade oriented. The US has been actively promoting free or reduced tariff trade, though some labor groups and members of Congress oppose this campaign. Chronic trade surpluses in Japan have focused attention in other countries on world trade and on lowering barriers to trade. The European Economic Community (EEC) has eliminated almost all barriers to trade and has adopted a common currency, the Euro. The U.S., Canada &Mexico have completed the NAFTA free-trade pact that will phase out most tariffs over a 15-year period. The consensus among economists is that free trade will eventually benefit all countries that participate. There are also emerging markets in Eastern Europe and the Commonwealth of Soviet States. Recent financial crises in Asia and Latin America may slow the liberalization of trade and global economic activity, but it is unlikely to stop it. Globalization can greatly complicate the task of managing IT in a firm. Yet, IT can greatly improve the management of firms with operations in many parts of the world.

Q25. What are the International business strategies?

Rohma Chopra

Ans. 4 major types of international business strategies:



MULTINATIONAL: The multinational strategy focuses on local responsiveness. Subsidiaries operate autonomously or in a loose federation. The advantage of this type of approach is that the firm can quickly respond to different local needs and opportunities. This strategy reduces the need for communications because local subsidiaries can make many decisions. There are heavy reporting requirements though because the results from the subsidiaries have to be monitored at a headquarters location.

GLOBAL: A global strategy stresses efficiency because there is strong central control from headquarters. Economies come from standard product designs and global manufacturing. An extensive communications and control system is necessary to centrally manage the global firm.

INTERNATIONAL: The international strategy is much like the multinational as there are autonomous local subsidiaries. However, these subsidiaries are very dependent on headquarters for new processes and products. A good example is a pharmaceuticals company. The research labs in the headquarters company

Ryohma

develop products for introduction around the world. Local subsidiaries stress product approval by local governments and local marketing.

TRANSNATIONAL: The transnational firm attempts to do everything! It seeks global efficiency while retaining local responsiveness. The firm integrates global activities through cooperation among headquarters and foreign subsidiaries. This difficult strategy tries to achieve local flexibility at the same time that it obtains the advantage of global integration, efficiency and innovation. We predict that the various types of firms will tend to strive toward the transnational model over time.

Q26. What are the Key issues in international environment?

Ans. INFORMATION NEEDS: An international corporation needs information to coordinate and control its diverse businesses. Reporting and early-warning systems are very important in this environment. Systems that summarize sales data and process accounting information are necessary, but they only reflect what has happened in the past. These systems represent traditional uses of IT for reporting and control. Technology offers the international firm many more active tools to help manage the business. Coordination is a major problem for the global firm. IT provides a number of approaches to improving communications and coordination, for eg, e-mail & fax. The emergence of groupware products is very important to international business. These systems let workers in different locations create a shared, electronic environment. Intranets encourage the sharing of information and provide for coordination as well. For eg, the design studios in different parts of the world of a car manufacturer can work on developing the same new automobile. Each studio posts its most recent design drawings on the company's Intranet, making them instantly available to designers in different locations. The Intranet provides the mechanism for coordinating the diverse design groups. The manager can use IT in a variety of ways to design the structure of the global organization. We can see that technology plays a crucial part in the design and operation of international firms.

Implementing International IT: The ultimate objective for the global firm is to process data anyplace in the world & share information without having to worry

Rohini Chopra

about the type of platform used for processing. The following section outlines some of the typical problems faced by a manager of a global organization:

1. The 1st problem is managing local development when the foreign unit does not coordinate with headquarters. The foreign subsidiary may be duplicating development efforts under way in other parts of the world. It also may not have a talented staff and may end up with poorly conceived & designed systems. The question of headquarters-subsidiary coordination and management is a central one in pursuing an international corporate strategy. The counter argument from the local company is that it knows the needs in its location. A distant headquarters unit cannot set specifications for foreign countries.
2. This contention leads to the 2nd development issue: How does the firm develop a set of common systems shared across different countries to take advantage of economies of scale? Headquarters does not want each country to develop its own accounting and sales reporting systems. Different countries have different laws and regulations, so it may be impossible to share programs among foreign locations without making special modifications for unique requirements in each country.
3. The 3rd development problem is that when designing applications, there are real and perceived unique features in each country. Designers, especially those representing headquarters, must recognize what features are required for a system to work in a country and what features are there as an exercise in local independence. For eg, Straub studied the use of e-mail & fax in Japan & the U.S. He found that cultural differences predisposed managers in each country to a choice of communications vehicles. Straub suggests that high uncertainty avoidance in Japan and structural features of the Japanese language explain why Japanese managers have a lower opinion of the social presence and information richness of e-mail & fax, though American and Japanese managers rated traditional communications media like the telephone and face-to-face communications about the same.

Managers must also be aware that more and more firms want to build a worldwide communications network to take advantage of communications and coordination tools to move data freely around the world. This effort can be a major challenge because of different technical standards and regulations. Certain countries regulate the kind of telecommunications equipment that can be used on their network. In a number of foreign countries, PTT (postal, telegraph and telephone) monopolies regulate communications and may restrict the ability to

transmit data. Some underdeveloped countries may not have adequate communications capabilities to support private networks. Countries also may prohibit importing certain kinds of computer equipment in order to protect domestic competitors. Different kinds of communications networks and standards can greatly increase the difficulty and cost of building worldwide communications capabilities. One of the most attractive features of the Internet is that it has open standards and a presence in almost all countries. It is pervasive in Asia and the West and has much less penetration of Africa and the Middle East (except Israel).

A number of government requirements may impede the development of global ISs:

1. A requirement to purchase specific equipment in the foreign country that may not be compatible with the equipment used by other parts of the global firm.
2. A requirement to do certain kinds of processing in the host country before data can be sent electronically to another country.
3. Restrictions on the use of satellites and special requirements for building private networks.
4. Limited access to flat-rate leased lines or a requirement that all transmission be made on variable cost lines.
5. Restrictions on Internet access and efforts to censor Web sites.
6. A major issue arising from international IS efforts is transborder data flows. Moving data across a boundary may be curtailed by government regulation, ostensibly to protect its citizens and their privacy. Another impact of regulation is to reduce the economic power of foreign companies or limit the imposition of foreign culture on the host country. Many of the transborder regulations seem to be motivated by a desire to protect local industry. Countries may have a legitimate concern about the privacy rights of their citizens. This reason is probably cited most often for instituting data controls. To implement control, a country can establish regulations through its telecommunications ministry, levy tariffs, and/or require formal approval of plans to process data in the country.

Examples of barriers to data flows include:

- Restrictive regulations that require processing of data originating in a country in that country only, making it difficult to transmit & share data.

Rajima Chopra

- Exorbitant pricing of communications services by government-owned post, telephone and telegraph ministries. However, a wave of "privatization" is sweeping countries and many PTTs are becoming private or quasi-private companies
- Attacks on computers by various hackers throughout the world have pointed out how difficult it is to secure networked computers.

As with any international venture, language and cultural differences can also present a challenge to developing IT on a global scale. Time differences can make communication difficult for different parts of the world, though fax and e-mail have eased this problem considerably. Some firms stress joint development teams with representatives from different countries to avoid problems stemming from developing a system in any one country or language. Foreign subsidiaries may be more willing to adopt an international system developed by a cross-cultural team.

Q27. How can we manage IT internationally?

Ans. Some of the impediments to IT require political action or deregulation, for eg, the policies of foreign PTT utilities. In other instances, management has to take action to solve problems and managers have to be involved in efforts to develop systems that will be used in multiple countries. It is management that has to sell its vision for the firm's global technological infrastructure and resolve conflicts over IT requirements.

Roche presents a number of strategies for managing IT in a global environment:

- Concentrate on interorganizational linkages
- Establish global systems development skills
- Build an infrastructure
- Take advantage of liberalized telecommunications
- Strive for uniform data
- Develop guidelines for shared versus local systems

CONCENTRATE ON INTERORGANIZATIONAL LINKAGES: The strategy of creating linkages with suppliers and customers can be extremely effective internationally. It can also be very difficult to set up these linkages because of differing telecommunications capabilities in different countries. In some regions phone systems do not work well and transmitting data over them is probably not viable.

Rohima Chopra

Other countries, like France, have an extremely well-developed infrastructure for business communication. The Internet is one solution for quickly establishing these linkages.

ESTABLISH GLOBAL SYSTEMS DEVELOPMENT SKILLS: There are problems managing IT development projects when all participants are from the same country and work in the same location. Coordinating multinational project teams presents an even greater challenge. Language and distance make them difficult to coordinate. A New York bank has a development team with members in New York, Lexington, Massachusetts and Ireland coordinated through groupware. In some foreign countries, hiring staff with the appropriate skills to work on technology can be difficult. Interviews with IT managers for multinationals in 7 countries found dramatic differences in their accomplishments and their capabilities. Lack of personnel skills can be a major impediment to developing international systems; not all countries have educational programs to prepare individuals for systems analysis or programming jobs.

BUILD AN INFRASTRUCTURE: Justifying expenditures on infrastructure can also be extremely difficult. Infrastructure is the part of technology that does not have an immediate benefit. The easiest example is a worldwide communications network. One money-center bank carefully costed out an international, private network and found that it had a negative NPV: The economic criteria suggested not to undertake the development of the network. However, the bank went ahead and found that the new IT provided a number of benefits that were hard to quantify. Basically, with this network the bank could "plug in" any application to the network and offer it anyplace in the world it did business.

TAKE ADVANTAGE OF LIBERALIZED ELECTRONIC COMMUNICATIONS: The trend toward deregulation in the U.S. is also sweeping foreign countries. France has split France Telecom from the PTT and established it as a quasi-public organization. In the past 2 decades, France Telecom has replaced an outmoded phone system and added a mass market communications network called the Minitel system. It is also a leader in providing packet-switched data communications through Transpac. Changes such as these facilitate the

Rydhima Chopra

development of the international communications networks, which is essential to managing in a global environment.

STRIVE FOR UNIFORM DATA: One of the major problems in sharing data is identifying it. A story is told that a large computer vendor once looked at its logistics systems and found that "ship date" meant 6 or 7 different things depending on the system involved. In one system it might be the promised ship date and in another the date the item left the loading dock. To obtain economies of scale from sharing data and systems, the firm must have a common vocabulary of terms and definitions.

UNIT 6

Q28. What are the issues in managing IT?

Ans. Various firms use IT to transform themselves and their industries. The key to making this happen is management. Management must lead the IT effort and see that technology is used to make the kind of changes that will keep the firm competitive in the future. Management has to view IT as a resource to be used in managing the organization. Rather than seeing IT as an expense to be minimized, consider how technology can be used as a part of strategy to change existing businesses and to undertake new initiatives. IT has become an integral part of the way organizations function. Success in the future may well depend on how well the organization manages IT.

Some of the key management issues:

The personal involvement of management in making decisions about technology is crucial, especially given the huge investments most companies have made and continue to make in IT. You can use IT to transform the organization. IT design variables let you develop entirely new structures. IT should be an integral part of a firm's corporate strategy. Managers and other users are the most likely source of strategic applications of the technology. Senior management needs a vision of how technology can be used in the firm. A corporate plan should include planning for IT. Management has the responsibility for designing and managing an IT architecture. It has to provide the basic infrastructure needed to take advantage

Rydhima Chopra

of technology. There are a number of different structures for managing IT. Today the federal structure is probably the most popular in a large organization. Management is also responsible for developing new applications of technology. It needs to focus development resources where they are most needed. Systems development is one of the most creative activities in modern organizations. Managing development projects has been a continuing challenge for companies. Reengineering focuses attention on business processes instead of functions. It also contrasts radical redesign with incremental improvements in processes. Management must decide on the source of IT services; for eg, there is the option of outsourcing to another firm. Managers determine what level of support to provide users working with technology and how much time users should spend developing applications themselves. Managers are in the business of change. Nowhere is change more evident than in implementing new technology and using IT to redesign organizations. IT, while easy to use in some respects, is constantly growing more complex. There is a continuing need for IT professionals in the organization.

Q29. Explain Management in a technological environment?

Ans. No matter what their functional area, managers today and in the future will face a highly technological environment. The costs of processing logic and communications networks are so low and the potential of this technology so high, that the proliferation of technologies will continue to accelerate.

What Do CEOs Think?

CEOs, according to surveys, want their IS departments to produce fast and flexible systems that impress customers and increase markets. The majority of CEOs report using a PC and almost 50% of companies do some outsourcing for IT services, the major reason being cost savings. Unfortunately, about half of the CEOs and CFOs surveyed said they are not getting an adequate return from their investments in IT. This level of dissatisfaction is a serious problem given the huge amounts of capital invested in technology.

A Political Model of IT in the organization:

Rydhima Chopra

TECHNOCRATIC UTOPIANISM: Firms characterized by technocratic utopianism are fascinated with the technology. There is an assumption in the firm that technology will solve all problems. The firm will develop databases, desktop workstations , networks and purchase large amounts of software. This organization often lacks a vision of how all of this technology will be used to further its objectives.

ANARCHY: Anarchy results when technology is not managed. Management abrogates its responsibilities to control IT and "lets a thousand flowers bloom.“ This strategy may encourage the bold to acquire computers and connect them, but as the firm matures, the lack of overall planning and standards will create tremendous problems. Many firms practiced this style of management in the early days of PCs, letting users purchase whatever equipment they pleased. As a result, these firms found it very difficult & expensive to connect their diverse computers to a network.

FEUDALISM: In the feudal model, powerful executives control technology within their divisions & departments. These executives determine what information to collect and choose the technology for their fiefdoms. They also make the decision on what information to forward to higher levels of management. This model is most often found when the firm stresses divisional autonomy. Because it is unlikely that 2 chiefs will follow the same model, again it can be very difficult to coordinate different feudal systems if senior management decides that coordination is a more appropriate technology strategy.

MONARCHY: In a monarchy, the CIO (Chief Information Officer) becomes the CIC (the chief information czar). Instead of playing the consultant role, the CIO establishes and enforces standards that will be followed throughout the corporation. The monarchy often emerges when the firm finds that it has suffered too long from the feudal model. A possible halfway point between feudalism and a monarchy is a constitutional monarchy, in which a document sets out the powers reserved to senior management and those that fall to the divisions.

FEDERALISM: In today's environment, the federal model may be the most appropriate. The firm tries to reach a consensus on which IT decisions belong at

Rydhima Chopra

each level and how information should be shared. The emphasis is on which policies make the most sense for the corporation as a whole, not just for a specific department or division. Senior management recognizes that local divisions need some autonomy; local managers recognize that information belongs to the company and may often be of great strategic value. In most cases, it makes sense for infrastructure like networks to be designed and operated centrally. If there are many opportunities to share systems across divisions, corporate management will encourage a strong role for a central IS group. Also, if the divisions have line managers who have little knowledge of IT, a central group has a major role to play in helping the divisions. In the case of very dissimilar divisions where there is little opportunity for sharing, we would expect to see the local unit have a lot of responsibility for IT decision making. A central IT group will provide some coordination, but most decisions will be left to local managers. This decentralization will be more pronounced if local managers are very knowledgeable about IT.

The CIO: The increased importance of IT to the firm has led to the creation of a CIO position. This individual, of course, is in charge of IT in the firm. However, the CIO is also an influential member of senior management and is usually a vice president or senior vice president in the firm. In addition to traditional information processing, this individual is responsible for voice and data communications and office technology. The job demands someone who can assume a role in planning, influencing other senior managers and organizing information activities in the organization. He or she must worry about strategic planning for the corporation and how IT can provide a competitive edge. The executive in this role must provide leadership and control over processing. It is important that planning, systems development and operations are all undertaken successfully. The CIO is a relatively new position in organizations, but more and more firms are expected to create such a post. A large firm might spend in the hundreds of millions or even more than a billion dollars a year on IT. A manager, not a technician, is needed to obtain a return from this kind of investment. Earl and Feeny describe ways in which CIOs should try to add value to their organizations. They found 2 types of CEOs, those who see IT as a strategic

Rohina Chopra

resource and those who see it as a cost. If you are the CIO of a firm whose CEO holds the views in the middle, liability column, then the job will indeed be challenging. Earl and Feeny argue that the CIO must find a way to add value to the corporation from its use of IT so the CEO will view IT as an asset. One role of the CIO is to determine if success stories from other industries or from competitors are relevant to the company. In one chemical company, managers dismissed stories of competitive advantage from IT saying they were not applicable in their industry. Unfortunately, at the same time a competitor was developing technology that gave it a competitive advantage. It appears the most successful approach to obtaining benefits from IT is not to identify separate IT and business strategies; rather, business strategy subsumes IT strategy. The job of the CIO is to build relationships with other functional managers so IT requirements become a part of business strategy. This approach means the CIO has to be involved in planning and strategy meetings across the company. To provide confidence in technology, the CIO must build a track record of delivering IT as promised, on time and within budget. Users quickly become cynical when delivery dates, cost estimates, and functional specifications do not meet expectations. Rather than scattering the development effort, a well-run company focuses its IT efforts on opportunities and areas where the firm is weak. The task of the CIO here is to determine not how to use IT, but rather where it should be used to most benefit the organization. The CIO has to be a promoter, marketing the potential of IT to transform the organization. A track record of delivering what has been promised will increase this manager's credibility as will good examples of organizations that have undergone technology-driven transformations. This summarizes the characteristics Earl and Feeny found among CIOs for firms that considered IT to be an asset rather than a liability. It shows how the CIO can add value to the organization.

Rohima Chopra

Added value of the CIO:

1. Obsessive and continuous focus on business imperatives.
2. Interpretation of external IT success stories as potential models for the firm.
3. Establishment and maintenance of IS executive relationships.
4. Establishment and communication of IS performance record.

5. Concentration of the IS development effort.
6. Achievement of a shared and challenging vision of the role of IT.

The CIO of Time Warner spoke at a recent NYU class about his role in the company and his comments provide further insights on adding value.

According to this CIO, he adds value by finding new business opportunities for the company and using technology to conduct business in new ways. The company manages IT in a federal structure so he takes responsibility for infrastructure like a worldwide network. IT managers in each division develop systems for their divisions and worry about the day-to-day operation of their systems. A central IS group is likely to function in several capacities. First, it will be a brokerage for applications packages. In some cases it will choose a standard, for an office suite for PC applications or a groupware product. It may also encourage the organization to adopt one enterprise software package such as the ones offered by Baan, SAP, PeopleSoft, or oracle. The central group may also act as a systems integrator, making the hardware and software systems from different vendors work together. The role of the CIO will differ among companies, but first and foremost this person has to be a manager concerned with the business as well as someone who understands IT.

THE CORPORATE INFORMATION SERVICE DEPARTMENT: Many organizations have a corporate information services department and separate Information Service departments at different physical locations. It is staffed with operations, maintenance and development personnel.

- The operations group is responsible for the ongoing operation of the infrastructure, including computers and communications networks. They run "production" jobs that process transactions and produce financial reports. This group installs new computers, expands networks and keeps software up to date.
- Maintenance staff members make changes to existing applications to enhance them and they repair errors that appear in programs. There has been a shift in the activities of the corporate Information Service department over time as the technology has moved from a focus on mainframes to the desktop. Originally, the corporate group controlled almost all of the firm's IT budget. Today they may be responsible for 50% or less of technology

Rohima Chopra

investment as other managers purchase technology from their budgets. Most organizations are content to have a central group provide and maintain infrastructure, the underlying network of computers and communications networks, for the firm.

- The role of a central group in developing applications of technology varies among organizations. A firm can decentralize & leave applications development to users, it may centralize this activity, or it may adopt a combination approach in which the central group consults with users who undertake their own development projects.

A Vision & Plan for IT: One task of a CIO is to be sure there is a vision in the firm for what IT can accomplish & a plan to provide a guideline for management decisions about technology. A vision is a general statement of what the organization is trying to become. A vision might describe, possibly in scenario form, the environment seen by a user. "We will use IT to support our strategies of providing the best customer service in the industry and becoming a global firm. Our first priority is to develop electronic links with customers and suppliers. Next, product brand managers will be furnished with a client workstation that can access the sales database. They will be provided with decision-support tools to conduct their own analyses of global data. Product development engineers will have workstations capable of running the CAD/CAM software." A vision might include a statement about the kind of technology architecture the firm hopes to provide, say, a client-server environment and a global network for communications. The vision needs to be sufficiently compelling that it creates enthusiasm for the plan to achieve it. It was important for IT strategy to be subsumed as a part of overall business strategy. Corporate and IT strategic planning should be part of one planning effort. The IT plan expands the IT component of the strategic business plan and describes how to execute the agreed-upon strategy. This plan must combine the vision of IT with strategy to produce a document that guides IT decision making. Suppose the overall strategy of the company is to become the low-cost producer in its industry. This strategy is to be achieved by reengineering existing processes and installing automated production equipment in manufacturing plants. The vision of the firm in 5 years is to have process owners in charge of business processes that have extensive technology support. The overall architecture is client-server, with a network

Rohma Chopra

connecting all plants and office locations. In addition, to pursue its low-cost producer strategy, the company will establish electronic links with key customers and suppliers. Thus, the vision and strategy provide the goals for an IT plan that will describe how to achieve them. This more operational plan will depend on the company and its strategy, but in general it will discuss hardware and software, communications and individual applications. Continuing the example above, the plan would detail the equipment needed to move toward the client-server model and a schedule for implementation. This section would also discuss networking, including the hardware and services required to provide communications. A key role of the plan is to identify the most important new applications of technology & prioritize them. It is important to focus efforts on applications that contribute to achieving the vision & strategy of the company. For the example above, do not be too concerned about routine applications. Management will probably decide resources should be applied to one or two reengineering projects & an effort to develop EDI with customers & suppliers. The plan would describe each of these projects in some detail including cost, time & staff requirements for completion. If management decides it wants to undertake more applications than there is staff available, some of the development will have to be outsourced. Having a plan makes managing IT requests easier for the CIO & for management in general. The rapid diffusion of technology has led to a flood of ideas & requests for how to use IT.

This is an example of the contents of one corporate plan for IT.

- ☐ Executive summary
- ☐ Goals- general & specific
- ☐ Assumptions
- ☐ Scenario- information processing environment
- ☐ Applications areas- status, cost, schedule, priorities
- ☐ Operations
- ☐ Maintenance & enhancements

Rydhima Chopra

- ☐ Organizational structure- pattern of computing
- ☐ Effect of plan on the organization- financial impact
- ☐ Implementation- risks, obstacles

The typical organization cannot afford to undertake every application suggested. A manager can evaluate applications against the plan. A well-prepared plan can create enthusiasm for IT, focus the technology effort on business imperatives as suggested above and help manage and evaluate technology. The plan is a fundamental management tool for seeing that IT makes the maximum contribution to the organization. We recommend that a representative group of managers work together to develop a plan for IT & the organization. A plan developed by a CIO alone will probably not be acceptable to other managers. The CIO should act as a resource, consultant & tutor for the planning committee. The idea is for technology not to be a separate plan, but to be integrated & to some extent subsumed, in a corporate plan.

OUTSOURCING AS A STRATEGY: Outsourcing involves turning over responsibility for some part of a firm's technology effort to an external company. In addition to obtaining services like systems integration for developing a specific application, a firm can outsource all or part of its IT effort. For eg, a large brokerage firm outsourced the operation of part of its communications function to a common carrier. The brokerage firm did not want to maintain the internal expertise to operate & continually update the configuration of the network.

Loh & Venkatraman have identified some of the factors that lead a firm to outsource:

- ❑ A firm that feels it is spending more on technology than it should (or more than the competition) may adopt outsourcing if it feels this option provides a lower-cost alternative than internal management. Even if the firm does not feel at a disadvantage compared to others, it may see outsourcing as a way to reduce IT-related costs in general. Several firms claim cost savings by turning their IT function over to an external firm. Another possibility is that large outsourcing agreements are motivated by companies' trying to return to profitability by cutting employment. (A company outsourcing all its IT

Rydhima Chopra

operations generally gets an immediate cash inflow when it sells equipment to the outsourcer & the outsourcer usually hires a large percentage of the company's staff, reducing its salary expense.)

- A firm with a high-debt structure may not wish to invest in technology. It may view outsourcing as a way to lease technology instead of buying it.
- An organization may feel its IT function is not performing adequately. Outsourcing can be a way to arrange for a more professional & better performing IT operation in the company.

Turner & Kambil have added to this list:

- An organization has decided to return to its core competencies. Managing IT is not one of these, so it outsources this task to another firm.
- The organization is interested in technology transfer from the expert outsourcing firm. It will learn from the outsourcer. Xerox outsourced the operation of its legacy mainframe systems to EDS in order to concentrate on developing new client-server applications.
- A firm may outsource "commodity" processing to free its staff to develop new applications of technology.

The outsourcing firm must have a high level of expertise in technology. This firm should also be able to create economies of scale. For eg, the telecommunications outsourcer can probably provide network services for a number of clients with a smaller staff than the sum of the networking staffs of its clients. The outsourcing firm may have a high-cost structure because of its need to employ highly skilled personnel. The need to have a contract with the outsourcing firm can lead to conflict & misunderstandings. Some companies are surprised at the cost of using an outsourcing firm to develop applications. Probably the biggest deterrent to outsourcing is the question of control. If you regard technology as a competitive factor in business, you may be reluctant to turn control of it over to an outside firm. The brokerage firm described earlier examined the option of outsourcing all of its technology effort, but decided that only one part of it was not sufficiently strategic to be outsourced. Lacity & Hirschheim studied a number of firms that

Ryohma Chopra

outsourced. Their criticism of outsourcing provides a cautionary note. Their study identified 2 myths of outsourcing.

MYTH 1: OUTSOURCING VENDORS ARE STRATEGIC PARTNERS: The outsourcing vendor cannot be a partner because the outsourcer's profit motive is not shared by the customer. The outsourcer makes more money if it is able to charge the customer higher fees. If the outsourcer can reduce service levels & collect the same fees, that also contributes to its profit margins. You might want to consider some kind of a cost-reduction sharing arrangement with an outsourcer so that both the services firm & the client benefit from more efficient operations.

Myth 2: Outsourcing vendors are inherently more efficient than an internal IS department: The outsourcer's argument here is that economies of scale help it to be more efficient. Today hardware costs do not favor huge installations. As we have seen, the cost/performance ratio for smaller computers is better than for mainframes. It is possible that the outsourcer can do some tasks more efficiently because it has done them before or because it can afford to share highly paid specialists among a number of clients. An outsourcing agreement will probably extend for a number of years in order to justify the transition effort involved. All experts in this field suggest that developing a contract between the outsourcer & the client is crucial. Since an agreement may be for 5 or 10 years, the contract must be highly flexible.

Business conditions & technology are expected to change during the life of the agreement. General Dynamics, which has an outsourcing agreement with Computer Sciences Corporation, is reported to have 8 contracts covering divisions that may each evolve in a different way. After entering a relationship with an outsourcer, the company still has to manage IT! You will still need the equivalent of a CIO to manage the partnership & contract with the outsourcer. Xerox reportedly has a dozen people managing its $3 billion, 10-year contract with EDS. The client still must look at emerging technologies & plan for its technology architecture. Creative applications are most likely to come from users rather than the outsourcer & there must be mechanisms for turning ideas into new applications of the technology. Outsourcing can be an excellent alternative for

Rohini Chopra

some companies, but you should not enter into an outsourcing arrangement with the idea that you will no longer have to manage IT.

How Much to Invest in IT: Most firms are not in the business of developing technology. They have a product or service to offer & the technology helps them accomplish the mission of the organization. Overall in the US, the Department of Commerce estimates that 45% of capital investment is for IT. Still, managers ask how much they should invest in IT? This question looks at IT as a cost. A better question is how much benefit can the organization obtain from its investment in technology? This question looks at IT as an investment. You will undoubtedly be asked to justify an IT investment at some point in your career. There are different types of investments the firm might make in IT. Each investment has a different probability of producing the benefits anticipated from the IT innovation. The probability is fairly high of getting a return from an investment like Chrysler's EDI/JIT efforts; the firm is unlikely to obtain a return from producing a report.

ESTIMATING VALUE: We are not always 100% successful in turning an IT investment into a finished application. This reasoning suggests that the probability of successfully obtaining a return must be weighted by the probability that an IT investment will have a return & the probability of conversion success. If we assume that the probability of a return on an IT initiative based on the investment type is independent of the probability of converting the investment into a successful application, we get the following IT Investment Equation:

P(Success/Return) = P(Return on Investment Type) x P(Conversion Success)
(1) where P means "probability of.“

The IT Investment Equation says that the probability of obtaining a return on an investment in IT equals the probability that the type of investment you are making has a return times the probability that you will be successful in converting the investment into a working IT application. Equation (1) calculates the SR index, the probability of a successful return.

Rydhima Chopra

Type of investment	Management & IT staff estimate of probability of a return based on the type of project	Estimate of probability of successful conversion effort	Overall probability of a return: the SR index
Budgeting system	0.5	1.0	0.5
JIT/EDI system	0.95	0.75	0.71
Infrastructure network	0.5	0.7	0.35
Package tracking system	0.2	1.0	0.2
Groupware	0.9	0.8	0.72
Web order entry	0.9	0.7	0.63
Web home pages	0	1.0	0

A few examples will help to illustrate what the equation means. The 2nd column is an estimate by management & the IT staff of the probability that there will be a return given the nature of the investment. The 3rd column is the probability of a successful conversion of the investment into a functioning system. According to our reasoning & the IT Investment Equation, the product of these 2 probabilities gives the overall probability of obtaining a return from this investment. The table illustrates how difficult it can be to obtain a return from IT investments. For a hypothetical budgeting system, management feels there is only a 50% chance the organization will obtain any return since the new application replaces an old budgeting system. It has a nicer interface & better reports, but managers could not honestly say the system will help them make more money. The 50% figure is based on the belief that there will be some labor savings. The IT staff thinks the package will be easy to implement & estimates a 100% chance of successful conversion. In the 2nd example, management is sure from seeing the results at other companies, that an EDI/JIT system for its factories will have a significant, measurable return. They are certain enough to estimate the probability 0.95. The IT staff, however, is a little concerned with the scope of the project & is only willing to estimate a probability of 0.75 that it can implement the system so all

the benefits occur. The rest of the table illustrates other hypothetical scenarios, an infrastructure investment, an overnight delivery firm investing in a package tracking system, order entry on the WWW, etc. Note the probabilities & how each one has a substantial effect on the probability of a successful return from investing in IT. Anything less than a probability of 1 for a return on the type of investment & a probability of 1 for conversion success dramatically reduces the probability that you will be successful in obtaining a return on an IT investment. Almost all IT initiatives involve some estimate of costs & benefits so that those making the decision to invest have a sense of the money involved. Managers are in the position of having to predict the return for specific investments in technology proposed by various actors in the organization. For applications that offer a direct return, estimates, by definition, are not too difficult, particularly when compared with the case of indirect returns. It has been suggested that infrastructure investments provide you with the opportunity to undertake some initiative in the future; you are buying an option to invest again. But how much is that option worth? What is its price & where is the market for it? What is the estimated return for a system that is a competitive necessity? For technology when it is the only way to do the job? Some experts suggest that you should look at the cost of not investing. What would happen to a new bank that failed to deploy ATMs? Could it remain in business? Would it end up being unable to build market share? If a valued customer says you must implement an EDI package, the cost is clear: losing the customer's business. Does that amount of business become the return on the investment in IT? Managers usually do not think in terms of probabilities; they prefer cost estimates. However, if there are probabilities involved, the decision maker should weight the cost estimates. If a geologist tells an oil company executive that there is a 60% probability a field contains oil that is worth $100 million, what revenue should the executive expect to receive from the field? The executive's expected value is the probability the field has oil times the value of the oil, or 0.6 x $100 million, which is $60 million. In general, **expected value** is the amount expected times the probability that you will receive that amount. In addition to estimating the probability of a return in the Investment Opportunities Matrix, most companies would try to estimate the cost returns from investing in technology. Typically, these returns are cost

Rohini Chopra

savings, cost avoidance, and/or new sources of revenue. If you estimate that the EDI/JIT system in Table 1 will save the company $1 million in its first year, then the actual expected savings will be your estimated savings times the probability of a return times the IT staff estimate of conversion success, or $1 million x 0.95 x 0.75 = $712,500. This reasoning leads to the IT Value Equation:

Expected Return = Estimated Return x P(Return) x P(Conversion Success) (2)
=Estimated Return x P(Success/Return) or

=Estimated Return x Equation I

where P means probability.

The IT Value Equation shows that the expected return from an IT investment is rarely the amount estimated by those involved; it must be weighted by the probability of obtaining the return & the probability of successfully converting the investment into a working application.

MAKING THE INVESTMENT DECISION: Table presents information for making decisions about IT investments. This spreadsheet combines information from the Investment Opportunities Matrix, the IT Investment Equation, the IT Value Equation & capital budgeting techniques. The table is an example of the information that management could use in making IT investment decisions. There are 2 capital budgeting techniques that have been used or proposed for making IT investment decisions. The first is the net present value approach or NPV, which figures out the net present value of income & expenses using the firm's cost of capital & compares the two to see if the result is positive or negative. A project with a positive NPV returns a value in excess of the firm's cost of capital. A second approach is to use an options pricing model that looks at an investment in IT as providing an option for making a future investment. This approach is new & somewhat controversial; it presents an interesting framework for thinking about IT investments.

Rohini Chopra

TABLE 24-6

A DECISION WORKSHEET

Name	Type	Cost	Estimated return	Probability of return	Probability conversion success	Probability S/R	Expected value	Capital budget model	Upside
Budgeting system	Required	$ 20,000	$ 20,000	0.50	1.00	0.50	$ 10,000		None
JIT/EDI system	Direct	$300,000	$ 500,000	1.00	0.75	0.75	$375,000	$ 957,058	Expand $5 million savings
Infrastructure network	Infrastructure	$100,000	$ 75,000	0.60	0.80	0.48	$ 36,000	$ 120,678	Allow future applications
Delivery tracking	Competitive necessity	$750,000	$1,000,000	0.40	1.00	0.40	$400,000		Prevent market share loss
Groupware	Indirect	$100,000	$ 50,000	0.90	0.80	0.72	$ 36,000		Restructure firm?
Web order entry	Direct	$100,000	$ 500,000	0.90	0.70	0.63	$315,000	$1,055,929	Reduce costs $500,000
Web home pages	Competitive	$ 50,000	—	0.00	1.00	0.00	—		Experience for e-commerce
Proposed Intranet	Infrastructure	$160,000	$ 60,000	0.80	0.90	0.72	$ 43,200		Internal Intranet
								$ 144,813	Present value 5 year savings
								$ (15,187)	NPV original proposal
								$ 37,608	Options Price experiment

Table identifies IT initiatives in a hypothetical example & describes their type. (One initiative might fit into more than one type, which makes for a slightly more complicated analysis; however, the same approach applies). The 4th column of the table is an estimated return from the project. The next 2 columns are probability estimates, the 1st column being the probability that this project, given its type, will have a return. The 2nd probability is for conversion effectiveness; what is the risk of this initiative? How likely is it that the organization can implement it successfully to meet specifications? The S/R index comes from the IT Investment Equation: It is the product of the probability of a return & the probability of successful conversion & represents the likelihood of a successful return. The expected value comes from the IT Value Equation. The Capital budget model column contains the results of applying a budgeting technique to the data in the table. These techniques do not necessarily apply in every instance. The rightmost column in Table comments on the possible upside benefits of the investment. The table contains a variety of projects for a rather diversified, hypothetical holding company. The company convenes an IT steering committee as needed; one of its tasks is to approve suggested projects. One can look at present IT investments

from the budgeting system to Web home pages & the proposed IT investment for an Intranet shown in table as a portfolio of IT projects. Management should try to balance this portfolio on several criteria. For eg, it is unlikely that one will obtain great value if all conversion probabilities are very low, or if all expected values are small. The S/R index provides an overall evaluation of the opportunity to create value from IT. Comparing a proposed project with the existing portfolio provides a picture of its contribution to the firm's efforts to obtain value from IT. In the past, the steering committee made decisions on all the projects in Table except the last one, the proposed Intranet. We review 2 past decisions to set the stage for discussing a new initiative for an Intranet. The budgeting system falls into the "required" category of application. Both the company's accounting firm & its controller argued persuasively that the old budgeting system was no longer suitable. The cost of this system is rather low since the company identified a package for $10,000 & it estimated that no more than another $10,000 would be required to implement the package. The controller estimated an annual saving of $20,000 in reduced clerical costs once the package is implemented. However, she lacked confidence in her estimate given this type of investment & the required nature of the application; she estimates a 50% probability of a return. The IT staff was very confident that it could successfully install the system; they rate the probability of conversion success as 1. The steering committee approved the system because its cost was low & because the controller made a strong argument that such a system was required for the business. The JIT/EDI system for one of the company's manufacturing subsidiaries required lengthy discussion because of the size of the investment. Based on visits to other companies using this approach, the IT staff felt that their company could expect to get all the estimated returns (probability of a return = 1.0); they also estimated a 75% probability of successful conversion. Given a project with an expected annual value of $375;000 ($500,000 x 1.0 x 0.75) & a $300,000 investment, there was no question about the economics of the proposal. The capital budget column shows a present value of a little under $1 million using a 5-year planning horizon & a 15% cost of capital; the NPV is $957,058 -300,000 or $657,058. The major issue for the steering committee was the $300,000 investment & the demands this system would place on the IT staff; A system of this size, done in-house, might

Rydhima Chopra

preclude some other IT initiatives, or force the firm to go outside for them. The steering committee approved this proposal because of its favorable financial projections & the upside possibility of even larger savings from expanding the system in the future. The steering committee held similar discussions about the other projects in the table, using the information provided as a basis for evaluating the projects & making a decision. The proposed Intranet approach looks very attractive compared to the projects already under way or completed. It has a high S/R index with a good probability of conversion success & of obtaining a return. The subsidiary requesting the Intranet classified it as an infrastructure expense. The subsidiary would gain from making information available throughout its operations & estimated that it could save $60,000 a year in paper & publishing costs. The NPV analysis shows a 5-year value of $144,813 using a 15% cost of capital; the NPV is this amount less $160,000, or -$15,187. The NPV in this case is negative. The subsidiary then recast its analysis of the Intranet in an options pricing model, even though it recognizes that this approach to IT investments is controversial. First the analyst determined that the company could develop a prototype for $30,000. This test Intranet would give enough information for deciding if the original proposal should be undertaken. At the end of the prototype development in a year, the company would need to invest another $100,000 to develop the full Intranet. The final results of her calculations in Table show the value of the option as $37,608, which is more than its cost of $30,000. Given this additional information from the options pricing model, it is likely that management will approve at least the prototype Intranet. Given the amount of money at risk, the firm might decide to proceed with the full project because the evidence for benefits from Intranets in general is very positive. In addition, the steering committee has been very supportive of Internet-type initiatives. Table shows that different criteria apply to project approval, depending on the type of investment. In some cases, quantitative analysis is very appropriate; in others, decision makers responded to qualitative factors. There are some companies that insist on a positive NPV before undertaking any IT project. While this rule probably sounds good to management & shareholders, Table suggests that these companies may be missing a lot of opportunities (at least if they are being honest in their NPV analysis). If a firm insists on a cost

Rydhima Chopra

benefit, NPV, or even options pricing analysis, it is likely to ignore proposed investments in several of our categories & some opportunities with considerable upside potential. In particular, it is hard to come up with credible quantitative evaluations of infrastructure, initiatives with indirect returns, strategic applications & investments that may transform the organization. Every proposal should be evaluated, but decision makers have to use criteria that are appropriate for the type of investment proposed.

Q30. What is the changing world of information?

Ans. The percentage of IT expenditures controlled by the professional IS group has steadily dropped. A corporate IT group is likely to be responsible for "legacy" systems (older systems, often for mainframes), corporatewide applications & infrastructure technology such as networks. More & more, the responsibility for IT management is shifting to users & line managers. The challenge for senior management in this changing world is to exert the proper amount of influence on & oversight of an increasingly complex technological environment. The hardware & software infrastructure is expanding rapidly as networks of servers & workstations grow. It is difficult to keep track of, much less manage, all the software & applications that local units develop for their own benefit. Senior management will continue to struggle with the balance between what appears to be critical for the organization & should be controlled centrally & what is best left to local management. The trends that are likely to continue are the declining cost of hardware, the explosive growth of networking, the Internet, interorganizational communications, the development of more sophisticated software packages, & the desire of users to do more computing under their own control.

Q31. What are the various action plans for the IT issues in management?

Ans. It is very difficult to reduce suggestions for managing something as complex as IT to a few outline points. However, the following suggestions on the next slide have proven helpful as guidelines:

Rydhima Chopra

Use IT Design Variables to Structure the Organization: One of the most exciting attributes of modern technology is your ability to use it in designing innovative & highly effective organizations. You can use this technology to design components of an organization or to structure an entirely new type of organization. IT design variables, in conjunction with conventional organization design variables, provide you with tremendous flexibility in designing an organization. The most likely outcome from using these variables will be a flat organizational structure with decentralized decision making. The firm will use electronic communications & linking, as well as electronic customer-supplier relationships to form alliances with other firms.

Determine & Communicate Corporate Strategy: If you & others in the organization are to help the firm achieve its strategy, you must know what it is!

1. Develop a plan for how to use IT. The plan should include:
   - A list of opportunities for your business unit.
   - A vision of how your unit should function & the role of IT in that vision.
   - A survey of current business processes that are good candidates for major improvement through process reengineering.
   - A catalog of areas for applying IT, including priorities.
2. Develop a long-range plan for the technological infrastructure.
   - Plan for hardware-software architecture for your unit given the constraints of the corporation, that is, what technology already exists.
   - Plan for the evolution of a network that forms the backbone of your technology.
   - Invest in infrastructure.
   - Investigate the use of standards to facilitate connection & interorganizational systems.

Rydhima Chopra

3. Develop ongoing management strategies for IT.
    - Support users in your unit & encourage them to work with the technology.
    - Develop mechanisms for allocating resources to IT.
    - Encourage innovation & reward it.
4. Manage systems development.
    - See that design teams are formed for new projects.
    - Participate in the design process.
    - Be sure you understand what IT applications will do.
    - Review & monitor development projects.
5. Be a user of technology.
    - Use IT to improve your own productivity.
    - Use technology to set an example for others.

IT is so pervasive in modern organizations that any manager will encounter it throughout his or her career. You will have the most success if you

(1) look at IT as something that allows you & your colleagues to be more effective, and

(2) actively manage IT.

Rydhima Chopra

Rydhima Chopra

Rydhima Chopra

Rydhima Chopra