Block 4 Strategic Enablers

Unit 10: IT and Strategy

Objectives

The objectives of this unit are to familiarlise you with

- the importance of IT in strategy
- the various factors, which influence the choice of IT architecture and infrastructure
- role of IT innovation and performance of a firm
- e-business and steps in e-business plan
- the role of IT in service quality

Structure

10.1 Introduction

Increasing competition, higher performance levels, globalization, and liberalization are examples of the immense changes that most of the organizations are face today. Companies are forced to continuously and organically re-organize and re-shape themselves, meanwhile changing functional hierarchies into flexible, high performance network organizations. To cope with these challenges, organizations need to consider information technology (IT) as an important factor; not only to strengthen operational efficiency and effectiveness, but also to quickly and constantly respond to customer needs and competitive pressures with IT-enabled products, services, and distribution channels, and IT-enabled links with customers, suppliers, and other stakeholders.

The rapid growth of technological innovations and the synthesis of information technology and computer networks are radically changing the way companies compete. Many business enterprises are making strategic commitments to technology for the purpose of gaining and sustaining competitive advantage in their industry. The creation of a competitive advantage through the use of information technology (IT) requires business executives to control this vital corporate resource and manage its use.

Over the last two decades, information technology has progressed from a purely academic topic to the point where it has been absorbed into the mainstream. There is hardly a company of any size that does not depend on information technology for its operational success. In spite of this success, information technology is often regarded as necessary evil consuming vast amount of resources yet having little strategic impact on an organization. Information technology is transactional and operational; it aids an

organization to automate many of the main operational processes; it enhances efficiency but its effectiveness is often a suspect.

Organizations see information technology as contributing to some of their goals - but they tend to be those associated with financial performance rather than with performance on the key and core strategic aspects. The nature and role of information technology has developed over the years. The original notion and practice involved the automation of simple, and single, existing manual and pre-computer mechanical processes. The next stage saw information technology deployed to achieve integration and rationalization of these separate, single systems. In each of these approaches, IT was (and largely still is) used primarily as an operational support tool.

By contrast with other waves of new technology, IT has a number of distinctive features that make its potential to influence social change very significantly. These features include:

- *Ubiquitous application:* Users irrespective of the type of business or role they perform can apply information technology in many different ways. An e-mail system, access to the Internet and data processing capability are just as relevant for a hospital as for a component manufacturer. In fact it is highly likely that they use similar hardware and software and could communicate and exchange data quickly and easily should they need to.

- *Dramatic rate of cost decline:* The price of processing power, data storage and transmission has fallen drastically. Today a simple electronic toy contains more processing power than was used on the Apollo space programme.

- *Universal ownership:* The increasing utility and ever lower cost of hardware and software means that they are now almost universally adopted. However the availability of bandwidth to enable rapid communication and transmission of data remains problem in India and is, therefore, a block to further development.

- *Exponential growth*: Continuous, rapid development and innovation means that the trends to cost reduction and capacity increase continue. The earliest telegraph equipment, using movable arms, had a capacity of 0.2bits per second while a fibre optic cable has a capacity of more than 10 billion bits per second. These developments suggest that the pace of change is going to be least at maintained and almost certainly increase due to endogenous growth.

A review of the literature suggests that many factors independently and collectively influence a firm's competitiveness (Porter, 1980). However, a growing stream of research since 1980 has examined the concept of IT as a powerful competitive factor for organizations (Porter and Miller, 1985;Barney, 1999). Recent research has suggested the need for a more integrative approach between IT objectives and business strategy. Other research has examined the value of IT as a viable competitive factor resulting is increased productivity, improved profitability, and value for customers. Studies on the role of IT in competitiveness have been primarily focused on large organizations. Few studies have emphasized the strategic importance and the value of IT in competitiveness. However, in

today's global market, and with the use of Internet and electronic business, even small and medium-size enterprises (SMEs) employ IT to increase their competitive position along with their large counterparts. This is believed to be due to fewer obstacles associated with systems integration and more flexibility to implement change.

In order to take full advantage of IT and to compete in the global business environment, the top management must recognize the strategic value of IT and exploit it. However, very few understand technology issues to incorporate them into their strategic plans. For this reason, IT professionals must identify information needs of the organization and develop an IT strategy that is in line with the overall corporate strategic plan. User departments and top management should participate in the development of an IT plan and communicate their needs to IT professionals. An IT plan includes factors such as: a computer hardware and software requirement, systems definition, changes to the existing systems and procedures, and the schedules and resource requirements for each project.

10.2 Information technology and Strategy

Information technology (IT) in every organization normally evolves from a means to improve the efficiency and effectiveness of as organization to a means to influence the strategic position of the company. The way in which management controls IT has changed simultaneously. In the first stage of IT implementation, efficiency is the primary goal and the attention of management is mainly focused on technology. In this stage, the IT professional is generally an outside consultant, who decides what is best for the organization. In subsequent stages, the effective functioning of the organization becomes as important a goal as efficiency. The management then becomes conscious of the fact that, next to technology, the design and structure of the organization is a decisive factor. User participation, information planning and the appointment of steering committees are indications of this. These organizations increasingly recognize the need for a methodical approach to IT planning, as a result of disruptions in management, reorganization, cost increase, or new usage possibilities.

To a large extent, organizations which have more experience with automation realize that IT can, not only improve the efficiency and effectiveness, but also that it is of decisive importance to the company's success. IT planning, subsequently, acquires a strategic quality in these organizations and, in fact, functions as a catalyst in all this. These organizations set up business architecture and IT architecture, based on an objective, qualitative and quantitative analysis into the current use of information technology.

A good strategy cannot easily be copied by competitors, because of the organizational, financial, social and technical cost and the trial period involved in attaining the strategy. Every organization has its own profile, environment and aims. Strategy indicates how the organizational structure should be designed and what the use of IT should be and should, therefore, be sufficiently concrete and specific. A specific strategy leads to a unique interpretation of the architecture and the infrastructure.

A good strategy focuses less on the product or the service itself and more on the delivery of services, reputation, etc. This is especially important for products that have been "commoditized". That is the reason why strategies differ in the same sector to a high

degree. For example, difference in strategy arises when the focus of a company is either the top or the bottom of the market. For instance, quality, product features and product innovation are applied in a very different ways in different segments of the same market. This leads to very different information needs and to a unique use of IT within the same sector. For example, quality, customization and product innovation are of vital importance to a premium car such as Mercedes while standardization, quality and low cost/price are vital to a budget car such as Maruti 800. In both cases, IT should strongly support these business processes and constantly provide the management with appropriate information.

Steps in Designing IT Architecture and infrastructure

In practice the realization of strategy, architecture and infrastructure is an interactive process . The development of an IT architecture starts with the business strategy. The business strategy will determine the “business architecture" – the organization structure and the organization processes and the business architecture in turn will determine the “IT architecture" and “IT infrastructure.

Business Vision

The business strategy should be precise and unambiguous for proper design and implementation of IT architecture. A good strategy starts with a clear business vision and it clearly spells out the direction the company is expected to follow in the years to come. A good business vision should be “inspiring enough to cause people to consider that it is worthwhile to give it their time and energy”. A business vision should be a challenge: not vague, but specifically focused on the organization. This is vital since it provides a framework for strategy formulation.

Business objectives

A business objective can be defined as the choice of policy that the company wishes to pursue to realize the business vision. The choices may concern the well-known "Ps": of marketing, namely, product, price, promotion and place and also strategic factors such as competition, clients, suppliers and replacement products. For example, the business objectives may deal with policy alternatives such as, market share versus profitability; short-term versus long-term orientation or; growth versus consolidation. Though the objectives provide overall direction for the organizations, they still provide specific direction for IT architecture and infrastructure.

Business Processes and operations

The business vision and the objectives by themselves do not sufficiently explain which aspects of the business should be reinforced, or what competencies the company should possess to perform well. Competencies can be of an economical, technological and an organizational nature, as well as of a social nature. By identifying the required competencies and establishing a set of performance measures, a firm can now translate the business vision into a number of concrete items of which it should be capable. The existing organization and IT will have to be modeled on this basis. Performance measures specify the capabilities, which should be developed. The design criteria are the essential

attributes required for success on the basis of which the organization and the IT are modeled. Performance measures can be very simple statements such as; "An important client should have a contact point within the bank and, therefore, we should appoint a key account manager." In practice this means a total transformation and it is quite natural that the senior management must guide such reorganization.

Business Architecture

Strategy has important organizational and technological consequences. Therefore, formulating a business strategy is insufficient to make the organization perform. The first step, after developing the business strategy is to, therefore, determine the business architecture required to operate business processes. The effects of the improved use of IT can only be expected when the company processes have also been effectively structured and when the responsibilities are well defined. This has consequences for the organization structure. In the business architecture, attention has to be, therefore, paid to the redesign of the organization and the way in which the organization should function in the future.

The business architecture is divided into three closely related blueprints. These three together constitute the business architecture:

Business function blueprint: This blueprint describes the dividing of company processes into responsibility fields and how they are put into practice (centralized-decentralized).

Data access blueprint: In order to implement the company positions, all information is necessary. That is why the information needs are described.

Application access blueprint: In order to approach the information, applications are necessary. In the application access blueprint the necessary applications are described.

IT Architecture

The distinction between business architecture and IT architecture is of major importance. In many organizations the architecture is mainly determined by technical and economical considerations. The organizational aspects are, therefore, mainly realized by means of the technical opportunities (technology push) and not on the basis of strategic and/or organizational considerations. Within the scope of the business needs, the business architecture offers the possibility to choose the best IT solutions. In this way, the IT architecture fulfils a "bridge" function between, on the one hand, business demands on information supply and, on the other, technological opportunities.

In the business architecture, the way in which the organization should function in the future is indicated, along with which information needs are important in this. The business architecture describes this in a more functional sense. The IT architecture translates the more functional description into technical solutions. The difference between business architecture and IT architecture is, in fact, comparable with the distinction between functional and technical design, which has been used by system development methodologies for years.

The business architecture is dominated by managerial and organizational questions (what). The answers to these questions are translated, in the IT architecture, into automation directions (how) and eventually in the choice of specific makes and types of technical means: the IT infrastructure (with what).

IT Infrastructure

The IT infrastructure is described as the setting-up and management of the whole hardware, software and data communication supply, in such a way that the business architecture and IT architecture can be implemented successfully. The IT infrastructure distinguishes itself from the IT architecture in that the concrete services and products are specified. At first it was sufficient to indicate that there was a need for mini-computers and workstations. In this phase it is determined which specific requirements the systems should meet, in terms of speed, distributed databases and the corresponding machines, local/long-distance communication opportunities, co-operative processing and user interfaces. Also, specific brands and types of products are determined.

Components of IT Infrastructure

The IT infrastructure is not only a matter of hardware, but also a complete integration of the information technology supply. Within this scope, the following components are recognized in the IT infrastructure:

IT components*:* The components are formed by the various hardware components, consisting of computers, displays, personal computers, printers, data communication connections and disk units. The software for the steering of all these components is included. In the choice of hardware components other factors prevail, such as compatibility (to what extent can computer systems of different makes and models actually exchange data), data communication possibilities, speed of processing, the price/output-relation and the ease of operation.

IT services: IT services are services, which execute specific assignments for applications. In the past, application programmers had to set up and develop their file organization on their own. Nowadays, the database management systems take over a large part of these activities. The same applies to the network management. The software involved takes care of the accurate operation and control of the data communication facilities and offers many facilities for management.

IT control instruments: The previous components, services and facilities cannot be put in, in a sufficiently effective and efficient way, if attention is not paid to control instruments as well. These instruments consist of: procedures, methods, techniques and tools for system development and the quality and experience of the automation personnel.

The IT infrastructure will function better if the products and services are connected and are in tune with each other. The company will profit more, and more directly by this. The more one is capable of putting in the IT infrastructure, the better one can do in the primary business processes. The IT infrastructure should not only support the most obvious business processes, it is precisely the support of strategically important business processes, which can lead to the greatest success. Therefore, it is important to select the

components and services in such a way that there is sufficient material for a fast and effective creation of new company facilities.

Factors in the IT infrastructure

In developing the IT infrastructure, other factors play a role as well. These factors are, among other things:

User-friendliness: An example of user-friendliness is the requirement that for every use at every place of work, the same meaning should apply to function-tests. This can also go in the direction of graphic presentations of data, the use of a mouse and the use of pull-up and down menus for the entering of data coding. User-friendliness requires computer capacity and may have consequences for the filling-in of blueprints.

Cost control: Cost control depends on the question as to whether intelligent terminals are being used, or not, at the workstation, on the installation of applications and the data storage at the workstation. The costs of hardware, communication and control should be weighed against each other.

Hardware policy: If different computer suppliers are employed, it should be questioned whether it is sufficient to deal with just one specific supplier, because of the desired functionality and the choices made in the IT architecture. Products of different suppliers, however, cannot always be linked.

Safeguarding: When information becomes more and more valuable, it becomes necessary to describe the requirements for the logical and concrete access to, and the use of, applications.

All the factors mentioned influence the parts of the IT infrastructure, and these are decisive in the IT policy. To sum up, the importance of establishing the IT infrastructure is that the IT architecture is defined, in a concrete sense, in the shape of:

- Descriptions of the necessary computer systems: from mainframes to personal computers and workstations;
- Descriptions of the local and central database management systems to be used: relational, distributed, data directory/dictionary;
- Descriptions of the program packets to be used: word processing, electronic mail, spreadsheets, desk-top publishing;
- Enquiry languages to be used: CASE tools, object-oriented languages, executive applications, image systems, expert systems;
- Descriptions of telematic products and services, among which are also client server concepts, videotex systems, local/long-distance networks and voice mail systems, EDI message processors, direct dialing from the workstation.

The total end result of the IT infrastructure also indicates that the IT architecture is judged in terms of:

- Technological feasibility, where attention is paid to what might be feasible, in the short and in the long term;
- Complexity, e.g. which products and services exclude each other (possibly in the short term);
- Controllability, e.g. knowledge and experience of the employees;
- Economic feasibility e.g. cost of acquisition and development and the operating costs.

Activity 1

Name any five companies, which have recently adopted technology as a part of the company strategy.

a

b

c

d

e

10.3 Use of IT in strategy implementation

Competitive Strategy and IT

Competitive strategy is an organization's approach to achieving sustainable competitive advantage over, or reducing the competitive advantage of, its competitors. Porter (1980; 1985) suggests that the success of organizations depends on how well they cope with and manage the five key "forces", namely, the bargaining power of suppliers; the bargaining power of buyer; the threat of new entrants; the threat of substitute products; and rivalry among existing firms, which shape an industry.

Successful organizations both react to, and influence, the five forces and by doing so, influence the nature and shape of their own industry - to their own advantage, naturally in promoting growth. To fuel this growth, there are two basic commercial strategies that organizations can adopt: product differentiation (directly related to a number of the options above); and low cost/price. These two basic strategies rely for their success on a whole platform of "second order" strategies concerned with, for example, product range and distribution. They are: cost leadership; differentiation; cost focus; and focused differentiation.

Strategic cost measures which result in cost leadership are aimed at:

- Reducing the total costs of the organization by reducing or avoiding specific costs;

- Working with suppliers, distribution channels, or customers to reduce or avoid some of their costs so that the organization establishes a "preferential partnership"; or

- Increasing the cost-profiles of competitors.

If these are the activities, resulting in strategic advantage, they must be supported by appropriate technology and IT. All activities, which form part of “differentiation strategy” and which is a variant of the competitive strategy should be supported by appropriate IT. Traditional data processing relates to accounting, order processing and other administrative responsibilities. Things are now starting to change - partly as a result of changes in technology and partly because senior managers are beginning to understand the nature of their businesses and the importance of a few core processes and key tasks. Thus IT is being aimed at the frontline, customer- oriented processes and activities relating to the production, marketing, delivery, and servicing of the product.

The Value Chain and IT

All components of the value chain are interrelated. When addressing IT, it should be designed to cut across the functional boundaries and integrate the various elements of the chain. This should lead to both cheaper systems - and, much more importantly, higher quality, more strategic information through improved linkages in the chain. IT can be used to redesign and reconfigure the system by reordering, regrouping, and restructuring the activities within the value chain.

Value Systems and IT

This value chain of an individual organization, which is competing in a particular industry, is embedded in a larger stream of activities that Porter terms it "value system". This relates to the external relationships with suppliers at one end, distributors at the other and competitors in the middle. Again, competitive advantage stems from an ability to manage these relationships more effectively than competitors. Certainly, in these days of extensive - if not ubiquitous and total - networking, interoperability of systems is vital. This extends outside of the organization so that it is certainly preferable for suppliers to share common EDI systems - and even data structures - to facilitate simpler data interchange with them. Again, this can lead to co-operative purchasing and economies of scale. It may even extend to risk management and disaster recovery agreements between organizations with similar standards and similar-sized technical installations.

For many organizations - especially small- and medium-sized enterprises (SMEs) - competitors may be a source of assistance. In many industries, co-operation with competitors is very common - through trade organizations, for example. Sometimes, small organizations have to group together in alliances to compete against a dominant large player. This cooperation may include a shared approach to, or at least experience exchange in relation to, IT.

Cooperation among organizations in relation to IT usually takes the form of (a) vertical integration, (b) outsourcing, and (c) quasi-diversification, whereby organizations cooperate across markets or across industries in order to better exploit their key

resources. Adopting parallel or compatible IT means that relationships with other organizations that were previously not possible due to high coordination costs or high transaction risk may become feasible.

Occasionally, there is very wide co-operation on IT within a sector or industry. This normally relates to infrastructure components such as networking and messaging but can apply to transaction-based IT. Such co-operation may be to the benefit of all if it produces lower costs or better quality service. EDI is an example of a shared technology - offering economy of information. Few firms have investigated the issue of shared IT - though the use of packaged software is obviously a form of this. All the strategies discussed above require the organization to change. IT can be a supportive facilitator of change - extending and enhancing organization choice and improving the quality of decision making.

Activity 2

Give one example each of cast leadership:

Differentiation:

Cost focus:

Focused differentiation:

10.4 IT for innovation and performance

Businesses are increasingly finding themselves in business environments facing rapid increases in both turbulence and complexity, leading to enhanced uncertainty and increased competition, which in its most extreme form, is termed as hyper-competition (D'Aveni, 1994). This has also led to an increased focus on innovation as a means of creating and maintaining sustainable competitive advantages (Nonaka and Takeuchi, 1995). In the wake of this development, efficiency and rapid access to knowledge and information (Barton, 1995; Grant, 1996) is becoming paramount. Consequently, spending on information technology (IT) has surged during the last two decades.

One type of benefit that managers attribute to IT is speed and responsiveness (Brynjolfsson, 1993). Speed is important in the development of successful innovations (Kessler and Chakrabarti, 1996). There is a positive relationship between using IT to increase effectiveness and the successful implementation of innovations. Grant (1996a; 1996b) focuses on knowledge integration within companies as important for creating sustainable competitive advantages. Huber (1990) further argued that the use of IT leads to more available and more quickly retrieved information. The importance of knowledge integration and availability of information may be linked to the positive relationship between using IT to improve internal communication and successful innovations, facilitating a higher degree of coordination and integration of activities. Also, by using IT, it is likely that the speed of the processes increases, leading to lower costs of development and providing an earlier introduction to the market (Kessler and Chakrabarti, 1996), which in turn will have a positive effect on the successful implementation of innovations. Use of IT can also lead to new ways of managing the company and enhancing productivity. This can be explained by the fact that IT has an

inherent potential in terms of improving coordination of cost reducing activities in the company and thus raising cost efficiency.

Customer satisfaction

Berkley and Gupta (1994) found a positive relation between the use of IT to improve service quality and customer satisfaction. This was also found by and pointed out as being of significant importance for many firms by Quinn (1996). The positive link between the use of IT to ease the work and customer satisfaction may be attributed to the inherent time saving, which could be transformed into more attention directed towards the customers, thus increasing customer focus and in turn customer satisfaction. The positive relation between the use of IT and lower costs, and customer satisfaction may be caused by customers benefiting from cost reductions in the way of price reductions, which will lead to increased customer satisfaction.

10.5 E-Business

The use of the term e-business implies that it is distinct from business *per se*. There have been arguments proposed that would suggest that the underpinnings of e-business are of such significance that it can be regarded as discontinuously different. If this is so, then it could be argued that a new business paradigm has emerged. The recent reversal of fortunes of the dot.com businesses has graphically emphasized the fact that they, and e-business, operate within the same business environment and context as conventional bricks and mortar businesses (Porter, 2001). However, fundamental to this is the technology that has enabled the e-business phenomenon to take place.

Web based Business Models

The rapid expansion of the worldwide web and e-Commerce has created a number of new business paradigms. The array of business relationships which have emerged in recent times include:

Business-to-Business (B2B)
Business-to-Consumer (B2C)
e- Market Places

The business-to-business space includes the various upstream and downstream transactions that enhance channel coordination and customer relationships. In B2B commerce, business partners and customers are connected via the Internet to participate in commercial trading and participate in communications and interaction. JC Penny, for example, shares packing, shipping, inventory and product movement with suppliers. In B2C, business are connected to their customers through the net and the various activities in the B2C space include, product ordering, sharing product information, creating display space, providing customer information, co-developing products and customer service. An example of B2C commerce is the product-tracking information offered by Federal express to the customers through its B2C activities. E-Market Place involves linking the company, its partners and its customers via the Web to provide opportunities for developing communication and interactions, including customer surveys and information

exchange on such things as product warranty and service capabilities. Figure 10.1 explains the web models and this interrelationship.

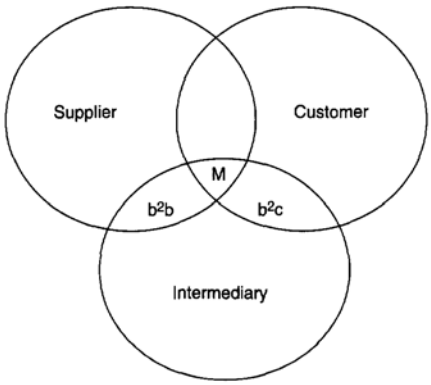

Figure 10.1: **Web-based Business Models**

In the context of e-business the business to consumer sector (B2C) can be considered as secondary to the potential within the business-to-business (B2B) sector. For example, one of the largest supermarket businesses in Europe, Tesco, also has the largest B2C e-business in Europe and one of the few profitable ones. However, despite this the revenue from this business is only approximately £300 million, from a total turnover of £23 billion.

The opportunity to link B2B network members and co-ordinate their activities by the quicker and more effective transmission of information relating to stock, order administration etc. has considerable potential for cost saving and service improvement. The often-quoted example of Wal-Mart and Procter & Gamble suggests that early and more immediate benefit can be gained by working through and interconnecting the supply chain (Christopher, 1998). Again, Tesco offers a further example with their leadership in this context using TIES (Tesco information exchange system) to link with their suppliers. The company also leads a forum of retailers with the aim of standardizing systems used by retailers and their suppliers.

Impact of e-Business on Organizations

The diffusion of Internet-based information systems throughout the workplace is changing the manner in which the firms work and the way they interact with their customers and suppliers. According to McKenna (1997), technology is transforming business environment in profound ways. Almost all technology today is focused on compressing to zero the time it takes to acquire and use information, to learn, to make decisions, to initiate action, to deploy resources, to innovate. When action and response are simultaneous, the firms are said to operate in real time.

This shift in time-demands and resulting competitive pressures are changing organizational structures: Increasing competition, information that could be outdated in the next hour and customers demanding immediate responses to product and service requests (customized to their needs) mean a major adjustment in company structure. To meet the challenges effectively, many companies have adopted reorganization strategies

that include downsizing, restructuring, re-engineering, outsourcing, and merging or spinning off companies.

The transition of operations in many businesses to real time operation has begun to churn up huge creative chaos inside corporations (McKenna, 1997). The Twenty-first century Corporation must adapt itself to management via the Web. It must be predicted on constant change, not stability, organized networks, not rigid hierarchies, built on shifting partnerships and alliances, not self-sufficiency. Internet-based technologies are creating information overloads where "a major task of practitioners is to help mobilize those frozen by the overload of information". Web-based information systems are also causing profound organizational changes: It seems logical to assert that Internet-based information systems have created profound changes throughout organizations. Researchers have begun to document the impact of these changes. One common thread appears to be that applications should be Web-based in their design, and that they support distributed collaboration and decision-making.

Organizational Change

In most organizations, few people possess all the information required to make optimal decisions. By taking advantage of Web-based information systems, associates can access information from many sources at any time and from any place. This has created more team-based decisions and new organizational structures. Thus, the inference is that Web-based information systems can lead to organizational changes by facilitating organizations that are more organic in structure and can adapt more easily to share information in a timely and coordinated fashion. Web-based technologies have similarly created performance improvements in organizations by changing roles and patterns of communication. Electronic networks open up new possibilities for reducing barriers to communication and sharing organizational knowledge and electronic collaboration tools can tap into expert knowledge and resources throughout an organization where productivity, flexibility, and collaboration will reach new, unprecedented levels. Success in increasingly competitive marketplaces will depend on effective communications and knowledge sharing among members using collaborative electronic networks.

Time

In terms of the impact of Web-based information systems on time, Byrne asserts, "Employees will increasingly feel the pressure to get breakthrough ideas to market first". He further contends, "that rapid flow of information will permeate the organization. Orders will be fulfilled electronically without a single phone call or piece of paper. The `virtual financial close' will put real-time sales and profit figures at every manager's fingertips via the click of a wireless phone or a spoken command to a computer". He further contends, "It is about speed. All this work will be done in an instant". "The Internet is a tool, and the biggest impact of that tool is speed", says Andrew S. Grove, chairman of Intel.

The speed of actions, the speed of deliberations, and the speed of information have increased, and it will continue to increase. That means the old, process-oriented corporation must radically revamp. With everything from product cycles to employee

turnover on fast-forward, there is simply not enough time for deliberation or bureaucracy. While this sounds like a positive impact, the shrinking time demands may cause increased problems in other areas, for example, employee stress.

Web-based information systems will have a profound impact on the organization and its structure. Organizational chart of large-scale enterprise had long been defined as a pyramid of ever-shrinking layers leading to an omnipotent CEO at its apex. The twenty-first century corporation, in contrast, is far more likely to look like a web: a flat, intricately woven form that links partners, employees, external contractors, suppliers, and customers in various collaborations. The players will grow more and more interdependent. Fewer companies will try to master all the disciplines necessary to produce and market their goods but will instead outsource skills - from research and development to manufacturing - to outsiders who can perform those functions with greater efficiency.

Therefore, as Web-based information technologies diffuse throughout organizations, there may be profound impacts on organizational changes, including the general flattening of organizational structures and the need to develop middle management teams that operate effectively within this new environment. Web-based electronic networks have been shown to have both positive and negative consequences. Anticipated, desirable consequences have included timely savings, improved productivity, and improved decision making via increased access to timely information. Innovation and creativity were also shown to improve when workers could share ideas and knowledge. On the other hand, researchers have demonstrated that Web-based information systems can also have a negative impact on workers. People feel pressurised by the real-time demands created by the non-stop presence of the Internet. They also sense loss of communication and relationships created by virtual communities and meetings, relationships based on physical and face-to-face meetings and conversations.

Identifying e-business application Areas

When examining the company for the possible application of e-business, one can focus either on internal processes and systems or on the externally oriented processes. If the main focus is to reduce costs or prepare systems for future e-business applications, the internal perspective might fit best. If the aim is to improve the customer's perceived value, one can best investigate the company's buying and selling processes.

Internal e-business Value Chain

Taking the value chain (Porter and Millar, 1985) and placing e-business technologies into the framework gives an insight into the reach of these technologies into the value activities. The exact meaning of all prevalent "e-" applications is less relevant as new applications arise every day and definitions vary widely. Linkages already exist between activities; some of these linkages have been integrated by using e-business technologies, ultimately providing a fully integrated e-business process. It is important to realize that these new applications have to be integrated with supporting and, if applicable, primary processes to prevent creating islands of automation.

The physical processes might have to be rearranged to better align the original value chain to the new e-business oriented value chain. Integration of the physical processes and e-business applications is essential to achieve maximum results. It is said, "a business is profitable if the value it creates exceeds the cost of performing the value activities" (Porter and Millar, 1985). Analyzing the e-business value chain can help in lowering the costs and increasing the value of activities. It has to be kept in mind that the supporting processes should be prepared for future e-business developments before embarking into large-scale "e-" systems.

Taking the Web marketplace as an example, one can see that, if a marketplace requires sound estimates for the delivery time of a product, e-fulfillment systems have to be in place and the factory floor automation has to be capable of providing this information. Supporting processes are not only the technical infrastructure, but also the databases holding all information and people capable of working with the systems.

Formulating an e-business Plan

Having identified the portfolio of specific e-business applications that need to be developed from a strategic perspective, these applications have to be brought into line with the existing IT architectures. Commonly identified IT architectures encompass the following:

- Information architecture;
- Systems architecture;
- IT infrastructure; and
- Organizational architecture.

As a first step, the impact of the identified e-business applications on the information architecture has to be assessed. The e-business applications can be integrated into the information architecture, taking the customary view of information architecture as the description of information systems areas in terms of the business processes they support and the data they use. Three possible situations can occur at this architectural level:

(1) A e-business application fits well within one information systems area. This means that the original information architecture is still valid.
(2) A e-business application covers two or more information systems areas. A decision needs to be made whether to merge the affected areas or to rearrange them in such a way that the e-business application falls into one new information systems area, together with possibly existing or projected other applications. The relationships between information systems areas have to be redefined in order to arrive at consistent information architecture for the new situation.
(3) An e-business application does not fit in any information systems area. A new information systems area has to be defined in terms of the business processes supported and data items created and used by the e-business application. Careful analysis of possible relationships with other information systems areas within the information architecture is needed.

A similar process has to be followed through for the systems architecture. Specific attention has to be given to the stewardship of the data items (who controls the creation of data, which mechanisms have to be in place to control any occurring redundancy?) and the integration of applications (how can we provide a consistent interface to the users?). The consequences for the IT architecture might be more severe, as e-business applications often call for substantially higher degrees of scalability and security. Accordingly, the required capacities and skills for the supporting organizational architecture may be very different from existing ones, which often gives rise to a renewed outsourcing discussion.

Through assessing the impact of e-business applications on existing architectures, several consequences are identified. Plans have to be made to properly incorporate these consequences within the IT architectures, describing what changes are needed to existing information systems, infrastructure, new developments or organizational layout. These consequences give rise to projects within the overall IT project portfolio of the organization. As a result, the project portfolio is populated with both e-business application projects and projects that need to be carried out in order to properly integrate the e-business applications with the business structures and IT architectures of the organization. Standard project portfolio management techniques can be employed to render a specific e-business plan for the organization.

10.6 IT in Service Sector

Past investments in service sector information technology have been aimed primarily at productivity or efficiency gains, and this is the measure that most firms use to gauge the benefits. Service firms have followed the lead of manufacturers in making great strides in getting work done with fewer employees mainly because of advances in technology. Competitive pressure is making service companies eliminate costs (mostly people) and new easy-to-use software is allowing the full application of computer power. On the other hand, little attention has been given to using information technology to improve customer service and long-run business effectiveness. Perhaps this is because the benefits of improved service are often qualitative rather than quantitative. Standard accounting systems can measure labour costs, but not the costs of poor customer service. Consequently, managers must justify new investments in information technology on the basis of efficiency gains and labour savings (Berkley and Gupta, 1994).

Input information

The input function in services includes forecasting customer demands so that necessary service capacities can be planned. Once customers arrive, expected services must be specified by questioning customers or by relying on service histories or observations of market trends.

Most service firms have rush or peak periods and are not able to provide quality service unless they plan and prepare for these times. Unlike manufacturers, service firms cannot maintain inventory of their products as a hedge against fluctuations in demand. At any given time a service may have excess demand or excess capacity and service quality can suffer in both cases. When demand exceeds capacity some potential customers may be

disappointed because they are turned away. There is also a risk that the accepted customers may receive inferior service. For many customers, even if it is good service, it is no good when it is late or slow. Armed with the proper information, service firms may be able to adjust capacity to match fluctuating demand levels. When peaks in demand are predictable, forecasting and capacity management systems can be used to construct detailed staff schedules that match capacities to demand.

In services, information must be secured from the buyer to specify the expected service. This is important because the more complete the information, the easier it will be to perform the other process functions. Customers also need to be made aware of the various services available and the likely costs of each alternative. Such information ensures that the needs and expectations of the customer are fulfilled and the organization's time and resources are not wasted in dealing with customers whose needs and expectations it cannot, or should not, fulfill.

Service errors are often caused by a misspecification of the service. For example, Federal Express found that wrong ZIP codes, wrong street addresses and even wrong names cause most of its routine mistakes. Often, a package misadventure begins when a clerk misreads a customer's handwriting. To improve service specification, Federal Express has introduced new self-serve kiosks, called FedEx Online, using bank automatic teller machine (ATM) technology. Each kiosk has a touch-screen video display for customers to price packages and print their own address labels (Ramirez, 1993). Major ocean shipping companies now use a Windows-based electronic data interchange software package called *Ocean* for customers to book and confirm their own orders. Ocean is expected to reduce data errors because the information keyed in by customers is fed directly into the carriers' systems (Radosevich, 1993a).

Service requires a long memory. With a computerized customer database, a firm can attach a detailed personal service history to the names of its customers. A record of each new service transaction can then be added to existing customer files. These updates help sketch an increasingly detailed profile of each customer's preference and expectation and create opportunities for more personalized and enhanced service. For example, Marriott's guest recognition system allows personnel to call up information about guests who have stayed at a Marriott hotel before. Marriott's system can predict that a particular guest will want a non-smoking room, a king-sized bed, an iron and a hair dryer. Customer service histories that are easily accessible allow frontline service providers to know on the spot which customers are first-time clients and which are loyal repeat customers. Such information allows service staff to acknowledge and personally reward the valued repeat customer and to solicit feedback and other important information from new customers.

Customer files enhance service consistency and server competence. Customer service records also ensure that service is personalized and consistent for repeat customers, even after their regular service-delivery person moves on to another job. The Nordstrom department store chain depends on its sales associates to provide individualized service to its loyal customers. Currently, individual customer preferences are resident only in the memory of a sales associate and the firm is working to convert this personal memory to corporate memory. An information system that allows customer files to be called up at many different locations would allow the firm to direct customers to different company

stores providing individual sales or services of special customer interest. This in turn will help build a customer-company relationship that is stronger and more valuable than a simple customer-store or customer-employee relationship. Customer service histories can speed service. In the medical field, computerized patient records speed service, cut costs and save lives. For example, computerized systems can warn physicians of potential problems such as allergic reactions or duplicated tests.

Customer service expectations are a moving target. To deliver superior service, a company must monitor customer expectations and customer response to the services it offers. While market research can be used to determine customer expectations, often the required information can be obtained at a significantly lower cost by listening to customers and employees. Most of the good service providers have a communication process to ensure that customer suggestions and requests are communicated up and down the organization to the people who need this information.

Although customers are the best source of information, they will rarely volunteer the necessary information. In industries characterized by large numbers of relatively small transactions, such as financial services and retailing, computerized point-of-sale and bar-code scanning devices can now record every customer service encounter. For example, in supermarkets, scanners speed checkout and provide customers with detailed receipts. Moreover, scanner systems provide management with continuous inventory updates and a detailed analysis of performance by product, by department and by store. The intended result is fewer inventory stock outs of popular items and improved customer satisfaction.

Knowledge

Service providers must possess the required skills and knowledge to perform service. Greater knowledge allows frontline service workers the better to help their customers and makes them capable of important judgements on matters that previously would have been handled by managers. Because employees can experience intense frustration when facing a customer and not having the answers, knowledge also supports employee job satisfaction, motivation and confidence in dealing with customers.

Knowledge databases allow relatively inexperienced people to perform very sophisticated tasks quickly. Whereas service providers, unaided by databases, are limited to their own knowledge, those with access to fast-response decision-support systems effectively possess the knowledge of many. This is particularly important when service firms rely on entry-level, part-time or relatively inexperienced workers. Information systems can also be used to reduce the knowledge required to deliver customized services and to improve service consistency. If the most relevant customizing variables can be specified and programmed in advance, the firm becomes less dependent on frontline personnel to perform the customizing tasks. For example, employment agencies try to identify job openings offering the desired salary, location, type of work and level of responsibility. Computer programmes can be written to search the job-opening files and automatically generate a list of feasible matches. Not only is the market knowledge institutionalized, but also much of the necessary expertise.

Quality in services depends heavily on the ability of employees to share their knowledge. Service expertise can be captured in either expert systems or group conferencing systems that provide electronic bulletin boards for sharing problems and ideas. Many professional service firms now find the core of their distinctive competence to lie in the accumulated knowledge in their databases and the capacity of their members to access and build solutions on these databases. For example, American Home Shield, a company providing service contracts for electrical, plumbing and heating systems in individual homes, has used the database it constructed to improve its service and learn as much as anyone about the performance patterns of equipment supplied by major manufacturers (Heskett, 1986). A number of software companies maintain textual databases of reported software problems and solutions. As solutions to particular problems are found, they are added to the database and become widely available to the technical support staff that takes calls from users. By recording problems and solutions centrally, these databases give leverage to the learning of each technical support person.

Job status

The longer it takes for service delivery to be completed, the more likely it is that customers will require information on work-in-progress (such as estimated completion times and projected costs). For example, Federal Express uses package barcodes that are scanned six times during the shipping process to maintain real-time records on package location. Recognizing customer concerns about whether the package actually arrived on time, there is a money-back guarantee if a package cannot be located within 30 minutes of a customer call. Many firms have developed customer information systems that allow customers direct access to production and shipping files. These systems reduce customer uncertainty and allow customers to measure firm performance. Frequent airline passengers expect occasional delays. What upsets these passengers is the lack of explanation and apology for delays. To be more responsive, Northwest Airlines passes information from its flight monitoring system to co-coordinators located in each airport who make sure passengers know the reasons for delay.

Quality control

Quality control consists of collecting data, monitoring (comparing the existing state with the service standard) and corrective action. The objective is to make corrections to the process before problems are created and customers complain. Many service problems can be identified before customers experience them. Consider patients who arrive at their doctor's office on time only to be told the doctor is running an hour late, or airline passengers who, on arrival at the airport, are informed that their flight was cancelled hours earlier. In situations like these, management could anticipate customer frustration and take steps to alleviate it, including calling customers to warn them of the problem.

Quality control begins with data collection to determine the current state of the process. This information is then compared to the service standard to determine if corrective action is required. When service standards are subjective (e.g. courteous service) or when the data are qualitative (e.g. employee behaviour, customer treatment, customer reaction), qualities data are ordinarily collected by direct management observation. On the other

hand, objective performance data, such as customer waiting and service times or system response times, can be collected and processed by information systems.

Complaints management

Customer complaints provide valuable information regarding service quality problems. A problem resolution situation should be viewed as an opportunity to learn how to improve service. The greatest risk is that customers will not bother to complain, but will simply generate negative word-of-mouth advertising and take their business elsewhere. Service firms should welcome complaints and make it easy for customers to complain. For example, British Airways has installed what it calls Video Point booths at Heathrow Airport in London so travelers can videotape their reactions on arrival. Customer service representatives then view the tapes and respond.

The closer to the point of service delivery a complaint is made, the better is the service recovery. Experience in many companies indicates that it takes longer to handle an escalated complaint at the head office than it does at the point of service. Once a complaint is lodged, fast response is the key. Customers should not have to wait weeks to get an answer or to get a problem resolved. At Coca-Cola complaints are logged into a complaint handling system and shared with all departments for analysis of likely causes and appropriate corrective action. As soon as the investigation is complete and an effective corrective action has been found, the customer receives a complete report of the root cause and the actions taken, usually within 48 hours.

Successful service firms track complaints by type (e.g. poor employee attitude, slow service), by frequency and by department. This is done because many service problems are not so obvious and, without adequate tracking systems, often go undetected. Some service companies also use complainant satisfaction tracking systems to measure the success of their complaint handling systems. These systems generally send customers who have complained a postage-paid reply card for evaluating the way their complaints were handled. Customer replies can then be tabulated by individual customer service representative, by location or by teams of complaint handling personnel.

Customer feedback is not always bad. Service firms also receive compliments. Customer compliments provide an opportunity to increase employee motivation and improve service quality. Unfortunately, many companies do not have an organized system for routeing compliments back to employees. This is particularly true for geographically widespread organizations where a compliment might be received in Singapore about service delivered in Paris. Verbal compliments should be recorded (the format is not important) and, with written comments, passed on to all employees who contributed to the service complimented and to their immediate supervisors. Typically, the effort and money spent on using compliments to motivate and encourage superior performance are returned many times over.

Service recovery

The best service is preventive rather than reactive. But, despite one's best efforts, mistakes are a crucial part of every service. The fact is, in services - often those delivered

in the customer's presence - errors are inevitable. But dissatisfied customers are not. A good service recovery can turn angry, frustrated customers into loyal customers. Good recoveries can, in fact, create more goodwill than if things had gone smoothly in the first place.

Service failures are best resolved when and where they happen, before they become costly to resolve and before they create lost revenue. To resolve problems when they occur, frontline personnel must be trained and encouraged to use their judgment. Employees need enough data to solve problems and make decisions while the customer is still present. In many cases (such as billing problems), recovery efforts require customer account histories and data from several company departments. If problems are to be solved on the customer's first call, this information must be readily available to customer service personnel. For example, image processing of credit card slips at American Express allows customer service representatives to find image records of customer transactions in seconds.

Nothing could be worse than saving a customer only to have the same mistakes repeated because other employees who needed to know were not informed. To prevent problems recurring, and to prevent weak recovery efforts that fail the customer twice, some firms use recovery-tracking systems that capture information pertaining to each instance of recovery service. This information is available so that all employees who deal with a particular customer will know what occurred, what recovery methods were used and what commitments were made. For instance, if a restaurant *maître d'hôtel* seats a patron with a reservation very late and promises a free dessert, the waiting-on staff should not later add this dessert to the customer's bill. To ensure accurate data, customer service representatives should be able to input information directly into the recovery tracking system. Direct access also facilitates retrieval of information helpful to recovery efforts.

Customer defections

Measuring service quality objectively through conformance to standards and subjectively through customer surveys is not enough. These techniques miss former customers who have left over the company's handling of an irregular situation. Identifying defecting or lost customers and measuring defection rates can provide a way to measure and improve service quality. The idea is to identify those customers who stopped doing business with the firm, then find out why. Defections can then direct managers' attention to the specific things that are driving customers away.

To measure defections one must have a defections scanning system to identify customers who have ended their relationship with the firm. If service or billing histories of customers are available, scanning the dates of last account activity easily identifies defections. Alternatively, many service firms, such as airlines, hotels, restaurants, rental car agencies, retail stores and even grocery stores, now have membership programmes and customer databases.

Often, customers are given a membership card that entitles them to discounts, and all subsequent purchases are logged against the card number. These databases then provide

service managers with an easy way to identify inactive customers and, often, clues as to why customers are no longer buying.

10.7 Summary

The rapid growth of technological innovations and the synthesis of information technology and computer networks are radically changing the way companies compete. Many business enterprises are making strategic commitments to technology for the purpose of gaining and sustaining competitive advantage in their industry. The creation of a competitive advantage through the use of information technology (IT) requires business executives to control this vital corporate resource and manage its use.

Organizations seek to gain competitive advantage in their selected markets via a number of competitive approaches - based primarily on product, service, differentiation and pricing policies. To understand the environment and customer behaviour they need robust, reliable information. In order to deliver to their chosen strategy, they must configure the organization (including extended configuration within the industry sector through alliances and collaborative ventures) and the various functional processes to deliver reliably and efficiently. Information Systems (IS) is used to configure the organization appropriately and to ensure communication between the various components. IS is then used to ensure effective communication within the extended value chain involving suppliers and the distribution network. Organizations hoping to make strategic use of IS must understand the nature of the inter-relationships of the above elements, and understand the nature of the information flows between them. IS activity and expenditure should be prioritized where it is clear that strategic information will result or where the activity is not effective without an underpinning IS.

Organizations, which are at the beginning of the use of IT often, focus on efficiency. They can do without a formal information planning method. The periodic drawing up of priorities and action plans per system is often sufficient. In this organization, IT is often placed in the existing procedure, without great changes in assignments or in the organization structure. In a later stage, automation is applied to solve bottlenecks, in the information supply and to improve effectiveness. For this purpose, it is necessary to chart the company processes and the information needs. The (often functionally designed) process structure of the organization usually remains intact. Most of the well-known information planning methods are extremely suitable for this type of information planning.

Increasingly more organizations, because of their complexity and the complexity and competitiveness of the market, are compelled to function in a more client-oriented way. In this case, information supply without bottlenecks is a necessary, but not a sufficient condition. It is even more important to choose the right strategy, process structure and responsibility, and in association with these, the right set of applications and the right infrastructure. These organizations discover that the functional organization structure involves obstacles and that information planning should not merely involve the establishing of priorities for individual system development projects.

In high customer-contact services, a firm's ability to deliver quality service depends on its capacity to collect, process and distribute information. The input function in services includes assessing customer expectations, specifying the expected service and setting corresponding service standards. Good service providers have communication processes to facilitate the collection of customer data, suggestions, requests and transactions into customer databases. These databases can then be used to construct detailed customer profiles, eliminate service-specification errors, speed service and improve service consistency. Output information is used to determine whether customer expectations are met. While customers are the best judges of quality, many service firms lack adequate systems for collecting and acting on customer data. Customer complaints provide valuable information on service quality problems. If customers complain, employees need enough information to solve problems and make decisions while the customer is still present. Complaints should be tracked by type, frequency and department to identify recurring problems that otherwise might go undetected. To prevent weak recovery efforts that fail the customer twice, some firms use recovery-tracking systems to capture and distribute information pertaining to each instance of recovery service.

10.8 Self-Assessment Questions

1) Explain the role of information Technology (IT) in strategy implementation. How can IT assist in enhancing the competitiveness of a firm?

2) What are the various components of IT architecture? What factors influence the choice of a particular IT infrastructure?

3) What is e-business? Briefly explain the various web-based business? Explain the steps involved in implementing an e-business plan?

4) How does IT improve innovative capacity and performance of a firm? Illustrate this with an example by scanning various sources of information such as web, journals, business dailies, etc.

5) IT is being extensively used by various service organizations to improve service delivery. Choose any service organization and explain how IT has enhanced the quality of service of this firm.

10.9 Further Readings

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