Module 1

Organisational Foundations of Information Systems

Introduction

This module starts with some elementary definitions of information technology and information systems and relates these to their use in a business or public-sector enterprise. In order to examine these relationships we will briefly review the characteristics of such environments, outline the major functions of organisations and introduce the four generic management processes and specific business processes within particular functions.

We then turn to the commonly accepted concepts of business objectives and goals. These concepts are used in turn to underpin the concepts of planning and strategy, various levels of strategy – corporate, business and functional – and finally a synthesis of the two concepts in introducing strategic planning. It is important not to skip over these concepts, as they will be used later on without explanation.

After this, we invite you to look at the impact of information technologies and information systems on organisations and provide sufficient detail to ensure that you are in possession of the basic understanding of technology to get the most from this course. It is important that you also understand the impact of new information and communication technologies (ICT) on the global economy and the evolution of electronic business.

Lastly, we revisit the question of business and public-sector organisational strategy and introduce the idea of strategy planning for the e-business. The module ends with a summary and references.

Outcomes

Upon completion of this module you will be able to:

- *identify* common business functions and processes in an organisation and their relationship to MIS.
- *discuss* the impact of IT on business.
- *differentiate* between information technology (IT), information systems (IS) and electronic business (e-business).
- *describe* the scope and nature of what is meant by "information economy".
- *identify* strategic MIS applications for e-business systems.

Terminology

Information System (IS)	A set of procedures that collects or retrieves, processes, stores and disseminates information to support organisational decision-making and control.
Information Technology (IT)	A powerful collection of elements which include computer hardware, software, telecommunication networks, workstations, robotics and smart chips. Often there is confusion between IS and IT. To clarify, information systems are "applications" having **functionalities** which can be exploited by the business and information technology provides **capabilities** which enable these applications.
Management Information System	The whole network of systems which support the organisation to manage their business affairs. MIS can be used interchangeably with IS.

Review of enterprise concepts

Every organisation has a **purpose**. This course does not assume that the purpose underlying all organisations is profit-related, as many non-profit or charitable organisations exist. Nevertheless, an organisation can be defined as a socio-technical system whereby people work coherently to accomplish specific goals that evolve from the organisation's purpose. From a systems approach, organisations are open systems – which means that they interact with the surrounding environment.

In this section you will review the basic concepts of a business organisation in relation to Management Information Systems (MIS), particularly with respect to the nature of the business, its mission, goals and objectives, and its business environment. You need a very good

understanding of the nature and characteristics of the business of an organisation before you can address the important issues of its business planning and Management Information Systems strategic planning processes.

For example, take a religious group in which the members have a common goal of discussing their beliefs and perhaps promoting them to non-members. The members comprise the social component of the organisation. The members gather regularly in the meeting room that serves as a catchment area for all people with a common aim. They interact with each other not only in the religious activities but also socially. They develop their friendship, and they share a common vision in seeing the group grow. In addition, the leaders of the group may aim at providing community leadership through organising other branches. The meeting rooms, notices, literature and activities represent the technical components of the organisation.

An organisation's purpose leads logically to a vision and a mission statement of the way in which the organisation plans to realise its stated purpose, and business organisations in particular usually set certain goals and objectives to guide their operations. For instance, the purpose underlying a software vending organisation is to sell software, but the vision of the software seller may be to become the most profitable company in the software industry. This will be achieved through top quality programs and after-sales service (the mission).

Goals or aims are general statements that say what is going to be done to serve the mission. Following on from these, the objectives are more specific statements usually set out in ways that allow us to measure them – and so see whether we have got there or not. For instance, a mission might be to outsell the competitors in 2013; an objective might be to increase sales by 10 per cent each month in 2013. A business organisation has a set of goals and objectives to be achieved. Hence, a business organisation should be structured in the most effective and efficient way to fully utilise its resources – capital, human resources, knowledge in products and services, and both external and internal information – to achieve its strategic goals. Organisations can be structured in many ways, and there are many ways in which communication networks (and communication is the "glue" that holds an organisation together) can operate within them.

The structure of an organisation is usually depicted by its **organisation chart**, which identifies its management structure according to the organisational units, locations, functions and their reporting relationships. You find the (formal) reporting relationships or chain-of-command within the organisation from the organisation chart. You can see from the organisation chart whether an organisation is a **centralised organisation** (tall structure) or **decentralised organisation** (flat structure).

1. Decision-making authority is usually tightly controlled by top management in a centralised organisation, but decision-making itself is often delegated to middle or lower management who are constrained by often exhaustive policy and procedure packages.

Not all organisational decisions must be made every time at the top level – top management pre-empts this need through delegation and regulation of certain types and levels of decision.

2. While decision-making is often delegated to middle-level or lower-level management in a decentralised organisation, that does not mean that the top management does not make decisions. In fact, coordinating decision-making in flat organisations is essential, as no part can become "greater" than the whole. Decisions in the units of a decentralised organisation must be kept in line with the purpose, vision, mission, goals and objectives of the entire organisation. You may observe, however, that the departments in many flat organisations often operate in a "tall" mode, as many middle managers seem uncomfortable with decentralisation.

What has been briefly described above represents some of the formal characteristics of organisations, but apart from formal structure and organisation, informal organisations based on personal interactions and relationships among employees (which are not shown by the organisation chart) also exist. An informal communication network called the grapevine, which carries gossip and other information throughout an organisation, often supports this.

This has been a very brief snapshot of organisations. Rather than a still camera, perhaps the right instrument for capturing the dynamic nature of organisations would be a video camera. Organisations and the business environment in which they fight to achieve their purpose are not static. The purpose, vision, mission, goals, objectives, organisational structure, chain of command, and especially personnel (managers and subordinates) can change in response to changes in the environment. In a healthy business organisation, the only constant is change – in ways of responding to the business environment at least. How does an MIS manager fit into this dynamic model of organisations?

Functional areas and business functions

A business organisation often includes **functional areas** such as administration, human resources, finance, MIS (management information systems), production, marketing, sales and purchasing. An enterprise (or business) **function** is a group of activities and processes put in place to support a specific part of the mission of the enterprise, and each activity or process is usually supported by a set of procedures.

Be warned that enterprise functions may appear to be the basic building units of a business enterprise, yet the business structure may not be based upon them. Is a city's commerce based upon the number of buildings that can fit into its grid of roadways? Obviously not, yet the roadways permit many of the exchanges that commerce depends upon. In the same way, enterprise *functions must be performed, no matter how the business organisation is structured*.

The focus should be on what is done by the functions rather than how or where it is done. In this section, you will become familiar with looking at a business in this way by reviewing an outline of what is meant by the functions grouped under the different headings of marketing, human resources, finance, management information systems, production and purchasing.

1. **Marketing** is a functional area that takes care of marketing research to identify and determine what products and services customers want. The marketing department must therefore act in close liaison with the production department. It starts plans and follows through with new products and services. This is supported by advertising and promotional programmes working together with advertising and public relations agencies and the media. Marketing specialists are employed in an increasing number of public enterprises. In government, research and evaluation projects, often by independent contractors, provide a similar perspective.

2. **Human resource** is a functional area that provides services in support of the following enterprise functions: recruitment, selection, training, appraisal and promotion of staff. It also administers staff records, payment and reward systems, and fringe benefits and makes sure that the work practices stay within the limits laid down by Ordinance. This department defines and revises job specifications and, when needed, hires new staff. Human resources departments in medium and small organisations often perform the administration function, but administration could be a separate department in large organisations. That function is responsible for all support services that include clerical, typing, filing, maintenance of the office accommodation, transportation, reception, telephone, facsimile and communications systems, collection and delivery of documents, security, advertising and other activities that are necessary for ensuring the smooth running of the organisation. In certain organisations, administration may have to deal with all relevant legal matters, MIS, purchasing, insurance and share registrations.

3. **Finance** is a functional area responsible for financial enterprise functions such as financial accounting, management accounting, and sometimes corporate finance and investment management.

   The **financial accounting** section handles bookkeeping, maintenance of audit trails, balance sheets, and profit and loss statements. Annual closing of books and liaison with the company's auditor also form part of the responsibilities of financial accounting.

   Management accounting undertakes all tasks relating to management reporting of labour and material costing, allocation of overhead expenditure, job and process costing, cost-volume-

profit analysis, budgeting, variance analysis, capital investment decisions and organisation controls.

For big corporations such as railways, bus transportation companies and telecommunications corporations, the finance department also undertakes responsibilities in corporate finance and investment of surplus funds. On one hand, the **corporate finance** section raises capital for the corporation at the lowest possible costs. This could be achieved through public flotation, rights issue, bonds, debentures, term loans and other financial instruments in the foreign exchange, money and capital markets. On the other hand, surplus funds can be deposited at a bank with a minimal return. Alternatively, funds can be invested in the financial market to reap more profit; this is the investment strategy of big corporations like Jardine Matheson, which operates a dealing room within the company.

4. **MIS** is a functional area charged with the responsibilities of developing and maintaining the smooth running of computer systems that capitalise IT to achieve organisational objectives. Such computer systems are classified into strategic planning, management control and tactical planning, and operational control systems.

5. The **sales** department sells whatever products and services are produced by the business organisation. It forecasts the sales volume by products and builds up a sales force that provides the best coverage in all the sales territories. The sales manager should maintain a close link with the production department as well as with advertising and public relations agencies and the media.In most organisation sales department is a unit of the Marketing function.

6. **Production** is a functional area responsible for enterprise functions such as quality assurance and production operations (in producing goods and services that meet the stipulated quality standards). It should ensure the effective and efficient utilisation of the production plant to meet customers' orders, maintain an optimal level of work in progress and minimise the rejects level.

7. **Purchasing** is a functional area responsible for the sourcing, supply and logistics of goods and raw materials that meet the stipulated cost, quality and inventory policy requirements while matching the production schedule.

A final comment about line and staff relationships in functional areas. The seven functional areas above have been described mainly from a staff perspective, but functional area managers can make decisions; that is, they have a "line" function too. They can make decisions affecting their own unit or department.

Enterprise functions, then, are the basic building blocks of an enterprise and they must be present, regardless of whether the organisational structure is functional, divisional or matrix. Enterprise functions are usually grouped under different functional areas such as human resources, finance, marketing and MIS. Each enterprise function consists of business processes that are supported by their respective business procedures.

Business processes and procedures

It is conventional management belief, especially in companies run by professional managing groups rather than founding entrepreneurs, that all business organisations should have a pre-defined set of goals and objectives, and that it is the job of managers to make sure that the goals and objectives of the company are realised. The performance of managers is measured by the extent to which business organisations can meet their goals and objectives; that is, can realise their mission and, perhaps, vision. Managers need to carry out certain tasks or processes in order to achieve these ends. The enterprise functions can be subdivided into **business processes** – processes that form the basic functions of a business manager. The following four processes are considered generic management processes: planning, organising, directing and controlling.

Planning

Planning is determining and deciding *who is going to do what by when, or perhaps planning is what is going to be done when by whom*. Planning charts the course for an organisation in a rapidly changing business environment, and planning steers the organisation from where it is now to where it wants to go. Hence, the first step in a planning process is the definition – a clear understanding – of goals. Sometimes goals are not available; then, you should delineate goals from the corporate mission statement or corporate goals and objectives. Objectives must be targets that are measurable within a certain time frame. For instance, one of the objectives of a distributor of printers might be to achieve a 25 per cent market share in the laser printer market sector in Asia in the next financial year.

Having defined the goals and objectives, you should then **formulate strategy** by taking into account competitors and external business, economics and political information. Hence, you should conduct a SWOT (Strength, Weakness, Opportunity and Threat) analysis by capitalising on the strength of the organisation and exploiting opportunities in the marketplace while minimising the risk that could arise due to the weaknesses of the organisation and threats in the outside environment. Further details of a SWOT analysis are dealt with under the topic "strategy planning process" later in this module.

Managers should usually plot more than one strategy, so they need to evaluate possible strategies using various methodologies; for instance, by assigning weights to different parameters before tallying and ranking the scores. Then they have to select from the possibilities. Most of the time,

they cannot find the best strategy because the "best" in a business context normally means the optimal alternative under a particular set of circumstances. Keep in mind, though, especially if you work in a so-called decentralised (flat) organisation, that any planning decisions you make could significantly influence the operations (and planning) of other functional areas. Planning is not an isolated business process – more often than not, it must be a collaborative function.

Organising

Having formulated a plan, managers must not only organise themselves in order to accomplish the objectives but also organise the activities of their subordinates. Such organising includes obtaining necessary resources like finance and equipment, and organising and scheduling their time.

Organising is assessing *what task* is to be achieved *by when*, breaking the task into smaller units, the sub-tasks, and allocating the sub-tasks to subordinates with definite completion dates. In the words of business organisations, a manager must develop an **action plan** which essentially coordinates and orchestrates the entire project on paper to allow the task to be completed on time. Keep in mind that organising may require the support of other functional areas such as Human Resources (HR). For example, if you were planning to expand or retool your department, you might need HR to perform the following enterprise functions: recruiting, training and performance appraisal of employees in support of your plan.

Therefore, HR's planning must be formulated, in part, based on your plans. **Recruiting** the right person is no easy task. It involves matching the applicant's personality profile, character, values, beliefs, qualifications and experience, upbringing and skill set with both the job specification and the corporate culture. You usually interview to select the right person. For certain jobs – computer programmer, for instance, the applicants may be required to take an aptitude test.

There are several dimensions in **training**, which include job-related training and induction courses. Job-related training could be on-the-job training within the organisation, or it could be special training courses offered by an outside training company. In-house induction courses aim to familiarise the new employee with the company's rules and regulations, policies, environments and corporate culture.

Performance appraisal is conducted regularly for employees who are evaluated on the extent to which they achieve certain mutually agreed objectives. They are given a total score that is a reflection of their performance during the period. The score is also a basis for salary increases and promotion.

This example of the relationship between "your" department and HR should underline for you how important it is that activities within organisations be co-ordinated so that all departments can plan and organise their own business processes.

Directing

The next step after organising is directing. **Directing** means implementing or executing the plan, having organised and deployed personnel in an appropriate structure. The leader leads, motivates, delegates and coordinates in order to complete the task.

It is often argued that a leader is born, but the leadership that a manager possesses can be trained through management development and training programmes such as an MBA (Master of Business Administration) degree. **Motivation**, by contrast, requires an in-depth analysis of the factors that might motivate an employee. A competent manager should be able to motivate his or her subordinates to consistently perform beyond past capabilities. Perhaps, **delegation** is most important in directing. One may be able to complete a small task entirely alone. But the leader who is responsible for completing a task on time is also given the authority to discharge the responsibility. The allocation of sub-tasks to subordinates is called delegation. How to delegate is an art, though. A manager must take into account how critical the sub-task is, the capability of the subordinate, the subordinate's work history, motivating factors and the completion date. Clearly, responsibility is passed on from the superior to subordinates. However, the superior is still held responsible and is still accountable.

Controlling

As soon as managers have implemented a plan, they need to know the extent to which they have done what they set out to do; that is, find out what the gap is and then take action to bridge the gap. Controlling is the process of *setting a standard, measuring the actual performance, and reviewing the variance*, which is the difference between the actual and the standard. If the variance is beyond the pre-defined tolerance level, some adjustments or remedial actions must be arranged. The standard could be a capital budget, sales volume or defect level.

Managers typically check how far they have kept in line with the predicted (or hoped-for) amount of outcome and then add corrective actions to get performance back in line with expectations. Because this happens over and over again, this process is known as iterative control. Here is a brief review of the foregoing comments about business processes. Apart from the generic management processes, business processes are usually specific to particular functions. A business enterprise function is a group of activities and processes for supporting a specific part of the mission of the enterprise. A **business process** is *a specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs – a structure for action*. Each process is supported by a set of specifically designed procedures.

Impact of information technology on business processes

An important process of information systems strategic planning is to establish the integration of business processes and information systems.

The idea of **Business Process Re-engineering (BPR)**, [which you will come across under similar names such as business process re-design, and so on] has been a hot topic for much of the 1980s and 1990s, but has now seen its more useful insights incorporated into the adaptation of business to e-business that we are seeing today.

Michael Hammer was an early and excellent spokesman for the BPR movement because he understood and taught that for an established business to take advantage of new technology and systems infrastructures, it cannot stick the new tools in place to support old ways of doing things. These old ways evolved in response to available technology and do not use the potential of the new tools. The designers of BPR thus laid the way for thinking about the transition to e-business when they set down their mission in the following terms:

1. Evaluate core business activities.
2. Consider business processes cross-functionally.
3. Re-design radically, don't just tinker, and
4. Aim for sharp improvements in performance levels.

Multinational companies like American Express and Citicorp have been famous in successfully applying BPR to improve their business processes to gain competitive advantages. Companies such as Cisco, Dell, Federal Express and Amazon have been the successor wave to push these ideas further into e-business transformation.

Integration of business processes and information systems

An important process of information systems strategic planning is to establish the integration of business processes and information systems. We emphasise the need for a thorough and comprehensive understanding of the business processes prior to the planning and implementation of IS. IS developments are usually based on business models as perceived by the systems analyst(s) and major users. The business model is a logical representation of the group of integrated business processes. The business model approach is considered an important start for reviewing an organisation's major functions, businesses processes and existing IS and data requirements.

In the planning, analysis and design of MIS, managers must usually review organisational and departmental mission statements, business goals, functions, processes and procedures. Changes to business functions and processes may also affect the organisational structure. Today, with the availability of networking and databases, business process redesign and cross-functional integration are common practices. These practices build infrastructure and linkages among functions and processes. Such changes must agree with the organisational mission and business strategy.

What is IS? Information systems versus information technology

Definitions

In order for information to flow from its source to an individual who can use it, some type of system, physical or otherwise, is required to collect, to store and then to move the information within an organisation. Thus, an **information system (IS)** can be defined as a set of procedures that collects or retrieves, processes, stores and disseminates information to support organisational decision-making and control. Many organisations have information systems that are entirely **manual**. Such systems are a subset of a wider class of systems, **computer-based information systems**, which rely on information technology as well as humans for their operational functions.

Information systems need not be necessarily **computer-based** but often are. The determining factor is whether an information system can be improved by including IT-based processing capability. If a manual system can perform a task efficiently and without error, there may be little reason to use IT. Managers more commonly find that the volume of work grows, procedures increase in complexity, or activities become more inter-related and/or dispersed geographically.

Then the introduction of IT can make improvements. Therefore, all subsequent references to information systems in this course refer to these computer-based systems. **Management Information Systems (MIS)** means the whole network of systems which support the organisation to manage their business affairs. MIS can be used interchangeably with IS.

Information technology (IT) refers to a powerful collection of elements which include computer hardware, software, telecommunication networks, workstations, robotics and smart chips. As IT is also at the root of information systems, often there is confusion between IS and IT. To clarify, information systems are "applications" having **functionalities** which can be exploited by the business, and information technology provides **capabilities** which enable these applications. For example, telecommunication is the technology that enables a computer to communicate with a remote terminal. This communication function could be used by an organisation by placing these terminals at customers' sites thereby allowing customers to use an organisation's computer for a variety of purposes such as order entry or inquiring order status. Thus, information systems are the **ends** and information technology is the **means**.

Managers and planners of Information Systems cannot afford to lose sight of the underpinning technologies. Two reliable recipes for disaster are too little grasp on the capabilities of technology, or too great a reliance on unreliable technology.

IS and IT strategies

Because of the interrelationship between IT capabilities, IS functionalities, and information use, an organisation has a great range of choices concerning what it will accomplish through how these tasks will be done. Organisations, therefore, need to make their choices in the form of IS and IT strategies to ensure gains from their IT investments.

Like business strategy, the terms IS strategy and IT strategy refer to the direction in which the organisation wants to go. Often the managers involved in the strategy formulation are confused between IS and IT. This confusion exists partly because of the loose terminology of planning and strategy, partly because organisations are still learning how to plan IT, and partly because senior management tends to be concerned about both **technology policy** issues and **business needs**, and about both planning information resources and controlling them. However, this delineation between IS and IT, or between **applications** and **delivery**, is valuable during the strategy formulation process.

The issue of what should an organisation do with the technology is termed **IS strategy**, whilst the question of how they do it is termed **IT strategy**. Thus, it should be clear to you now that **IS strategy** is concerned primarily with aligning IS development with business needs and with seeking strategic advantage from it. By contrast, **IT strategy** is concerned primarily with technology policies: it tackles questions of architecture, including risk attitudes, vendor policies and technical standards. In this context, **IT architecture** refers to the **technology framework** which guides the organisation in satisfying its business and management information systems needs. It is the blueprint that defines the technical computing, information management and communications platform of the organisation, the structures and controls that define how that platform can be used, and the categories of applications that can be created upon the platform. The IT architecture provides an overall picture of the range of technical options available to an organisation, and as such, it also implies the range of business options. It includes the hardware and software used to manage information and communication; the tools used to access, package, deliver and communicate information; the standards, models and control framework; and the overall configuration that integrates the various components.

This is a fairly important and fundamental section, so here is a summary. **Information systems (IS)** are computer-based systems for collecting, retrieving, processing, storing and/or disseminating information to support organisational decision making and control. **Information technology (IT)** represents the technological infrastructure, including computer hardware, software, telecommunication networks, workstations, robotics and smart chips, that provides the capabilities for the information systems. **IS strategy** refers to what an organisation should do with the technology, whereas the question of how they do it is **IT strategy**.

Why Information Systems (IS)?

Impact of MIS on organisations

MIS exerts a strong influence on organisations because it can affect both production and coordination, where **production** refers to the task of producing goods or services. A major research programme, called Management in the 1990s, was initiated at the Sloan School of Management at the Massachusetts Institute of Technology (MIT) in 1984 to examine the impact of IT on organisations.

The findings of the research were:

- IT enables fundamental changes in the way work is done.
- IT enables the integration of business functions at all levels within and between organisations.
- IT enables shifts in the competitive climate in many industries.
- IT presents new strategic opportunities for organisations that reassess their missions and operations.
- Successful applications of IT require changes in management and organisational structure.
- A major challenge for management in the 1990s would be to lead their organisations through the transformation necessary to prosper in the globally competitive environment.

We describe below MIS's impact on work, business functions, industrial competition and organisational strategy.

Impact of MIS on the nature of work

The extent to which MIS has an impact on a person's work depends on how much of the work is based on **information**. This information may be related to **production work**, which is the work done to produce goods and services, or to **coordinative work**, which involves working in conjunction with others.

MIS's high potential impact on **production work** is obvious if we break production into its three constituent elements:

- **Physical production**, which is affected by robotics, process control instrumentation and intelligent sensors.
- **Information production**, which is affected by computerisation of the standard clerical tasks such as accounts receivable and billing.
- **Knowledge production**, which is affected by computer-aided design/computer-aided manufacture (CAD/CAM) tools, customised workstations for specific work such as new software and new legislation.

As an enabler of connectivity, IT has a high impact on the economics and functionality of the **coordination process**. This impact can be easily seen in three areas:

- Distance can be shrunk to almost zero through electronic communications.
- Elapsed time can be shrunk toward zero or tasks can be shifted to a more convenient point, as in the case of airline reservation systems, which could be used worldwide all the time.
- Organisational memory can be maintained (through a database) over time and can be shared among many users.

In addition to production and coordination, IT also affects **management work**, especially with respect to its direction and control aspects. As for **direction**, it involves sensing changes in the external environment, which is easily facilitated by IT-based systems such as an executive support system or a customer feedback system. For **control**, IT helps in tracking an organisation's performance and analysing the variance against the plan or pre-set standards.

Impact of IT on business functions

Enhanced connectivity and information accessibility through IT has permitted an "any information, at anytime, anywhere, and any way one wants to look at it" philosophy in a cost-effective manner. Thus, boundaries of organisations are becoming more permeable; and where work gets done, when, and with whom is changing. This has enormously speeded up the flow-of-work in and around the organisation. In turn, this has permitted possible integration in many areas such as:

- **Teams within the organisation**. For example, design, engineering and manufacturing people can be connected together through local and/or global networks to work as a **team** focusing on one product, as done by Xerox.
- **End-to-end links between organisations**. For instance, a supplier's shipping department can be connected to the buyer's purchasing department for business transactions. This shifts the boundary of the organisation out to overlap with others, thus creating a **virtual organisation**.
- **Electronic alliances**. An organisation may perform one stage or part of a manufacturing or design task and subcontract either a specific task or the whole stage to another (electronically linked) organisation.
- **Electronic markets**. Here, coordination within a few or all organisations gives way to an open market. For example, travel agents can reserve seats electronically from all major carriers, and therefore can look for a best price for the customer. Thus the reservation system acts like an electronic market.

Impact of IT on industrial competition

At the industry level, IT has a unique impact on the competitive climate by permitting a high degree of simultaneous competition and collaboration between organisations. Take carmaker X, for example, which requires the clerical staff of its suppliers to use T's electronic communications system for paperless ordering. The more suppliers who conduct transactions over this system, the lower its cost per transaction. Thus suppliers compete with other suppliers and at the same time collaborate with them by sharing the same communication links.

Another unique impact of IT on competitiveness concerns the importance of **standards**. It is now important for an organisation to know when to support standards and when to try to pre-empt competitors by establishing a proprietary de facto standard.

Impact of IT on organisational strategy

Even before you study Porter's five-force model in Module 2, you can take advantage of the model to look at the impact of IT on organisational strategies, because it identifies five areas of risk and opportunity.

	Opportunities	**Risks**
New Entrant	To build barriers	To lower entry barriers
Customers	To build in switching costs	To increase customers' power
Rivalry	To change basis of competition	To change basis of competition
Suppliers	To change the balance of power	To increase suppliers' power
Substitutes	To generate new products	To generate new products

Table 1.1 Impacts of IT on organisational strategies

The innovation of Frequent Flier Points Systems illustrates the double impact of IT. These systems resulted from IT-driven strategies allowing airlines to collect data on clients and their airline bookings through a centralised MIS. The points system radically altered the balance of power in the industry. Instead of straightforward competition based on price or service, airlines now faced clients' expectation of added value from loyalty programmes. On the supply side, the system erected a fresh barrier to new entrants. On the demand side, it exacted a switching cost: customers choosing another airline would forfeit their points. Effectively this programme gave American Airlines some two years of lead in the battle for customer capture and retention.

To be efficient as an MIS manager, you need to understand the technologies available to you in the form of your IT platform. To summarise again: IT exerts a strong influence on organisations. It changes the way work is done, whether it is production, coordinative or

managerial work. It integrates business functions at all levels and gives rise to organisational teams, electronic alliances and electronic markets. It permits a high degree of simultaneous collaboration and competition in the industry. It presents new strategic opportunities and changes organisational structure. IT, therefore, posed a major challenge for management in the 1990s to catalyse the necessary transformation of their organisation.

Approaches of information systems

Introduction to strategic approaches

With the advent of the Internet and e-commerce and the increasing transformation of business through the expanding use of ever more reliable and powerful ICT, business and government is becoming increasingly interconnected and interdependent. This interconnectedness, arguably, helps organisations to face challenging contemporary environments increasingly characterised by a global span of business operations, turbulence, change and uncertainty, innovation, hyper-competitiveness and the like. Module 2 discusses how the interconnected world of business spawns new inter-organisational forms. Important among these is an **Extended Value Network (EVN)** of collaborating partners, linked and communicating with the help of modern ICT. This module explores more deeply how such a complex organisation can develop effective strategies for this interconnected strategic business network, its partners, its suppliers and potentially, its customers or clients. You will also learn more about the information and resource-sharing strategies of "co-opetition," as observers call the ethic that is replacing naked aggression and competition in many organisational contexts.

Most effective modern corporations, we believe, are embedded in strategic business networks to a greater or lesser extent. In this module we look at approaches to strategy formulation for strategic business networks, commenting on the need for some changes in emphasis in strategy formulation, given the realities of the contemporary business environment. You should be aware that there are still many divided opinions about the best approach to strategy in this new e-marketspace. Because of this controversy, Module 3 shows you a number of alternative views to help you put these opinions into context. If you work for a non-profit organisation, you will also realise that the emphasis has now shifted from cost saving to more effective client services, and this is also forcing public corporations to embrace customer-driven strategies for success.

First you will re-examine the concept of strategy, looking specifically at the work of one of the foremost writers on strategy over the last 25 years, Michael Porter.

Generic competitive strategies

There have been many different approaches to strategy over the last 40 years but one of the most significant influencers was the Competitive Forces Model, which Michael Porter proposed in 1980. The most significant factor differentiating this from other models was the emphasis not on internal organisational factors but on external factors. Porter held that five critical factors needed to be analysed:

1. Industry competition
2. Suppliers
3. Customers
4. New Entrants
5. Substitutes

For each of these, specific barriers to entry have to be found and, according to Porter, there are then three generic strategies that can be pursued by firms to achieve commercial success.

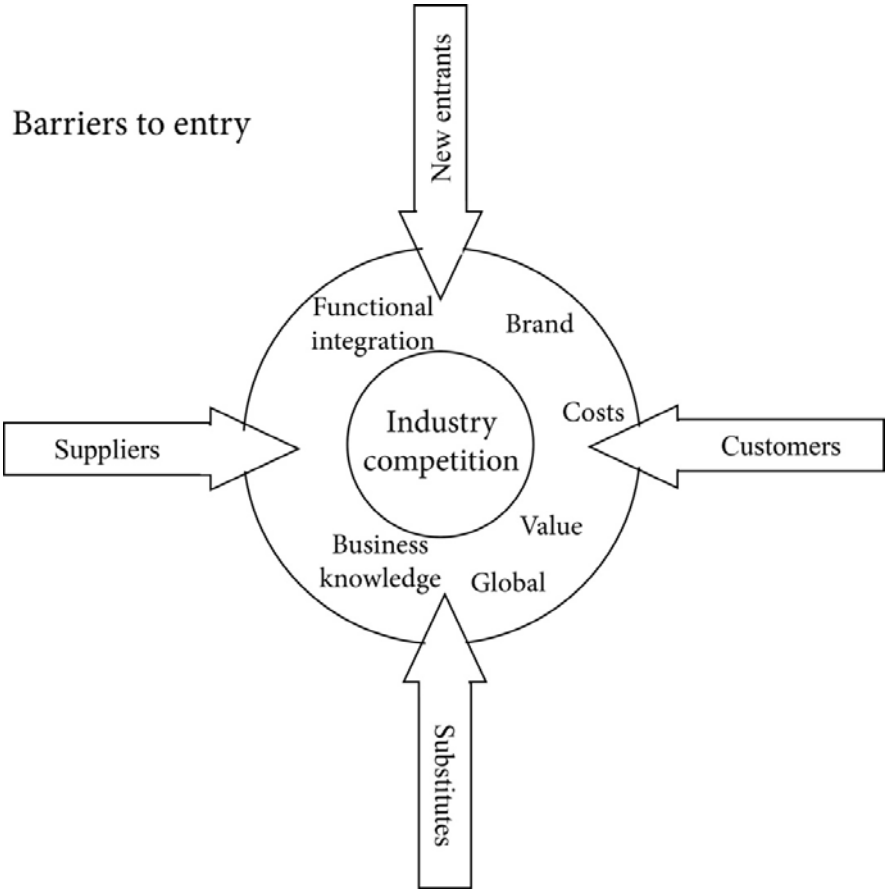

Figure 1.1 Porter's Five Competitive Forces Model

These three strategies are:

1. **Cost leadership**: pursuing a position of being the lowest-cost producer through economies of scale and benefiting from "experience curve" effects in order to build and increase market share.
2. **Differentiation**: providing a product or service with a unique characteristic which allows the company to charge a relatively higher price and thus generate better margins.
3. **Focus or niche**: concentrating on a specific market segment.

In order to pursue any of these strategies successfully and possess sustainable competitive advantage, companies need to exploit key assets.

It is often considered that the niche/focus strategy is particularly vulnerable, as a company in such a niche may have difficulty defending itself against a frontal attack from a better-resourced competitor. (This is a strategy which IBM frequently employed against competitors and one which Microsoft is frequently accused of.) Porter also argues that companies have to watch out not to become "stuck in the middle" between the three generic strategies. However, as we have emphasised, strategy development in this fast-moving and often turbulent e-market space is particularly difficult. Many organisations will not be able to do more than "muddle through" or try to stay as flexible as possible in order to adapt their strategy opportunistically to the rapid changes around them.

It has been argued (Hagel and Armstrong, 1997) that Internet-based e-commerce brings the ideal of perfect competition close in the sense that:

- barriers to entry are lowered,
- transaction costs are reduced,
- customers have improved access to information,
- marginal or customer-oriented pricing becomes possible, and
- minimal legislation and regulation and other forms of intervention by public authorities exist.

However, the Internet also creates new barriers to entry. Such barriers can be based on the capability to manage complex relationships, as in the internetworking of many parties in the automotive sector, or in the multitude of procurement relationships that exist around large firms. They can also, at the same time, be based on intimate relationships with the customer. There are plenty of opportunities for new "middlemen" such as auction-based business models who can wield considerable power, add value for both customers and suppliers, and shift the focus away from pure price competition. It is also the case that global branding has become a key factor and we will discuss this further in Module 5.

Specific opportunities which can be taken advantage of are:

- branding and global partnerships, for example, TradeZone, FedEx;

- limited competition on the Internet;
- added -value services such as secure payment systems, intelligent agent-based product search and price negotiation systems;
- integration of information and functionality: for example, combining front-end and back-end systems through Internet-based Enterprise Resource Systems (I-ERP), forming technical and marketing alliances;
- extending services such as provision of customer training, help or maintenance services over the Web; and
- using one-to-one marketing tools and creating customer loyalty.

Currently, price competition is not a real issue since there is still time to grow in the market, but this is likely to change in the very near future.

Strategy and the Internet

As you have read already, there are those who believe that the Internet renders formal strategy obsolete, since the rules of competition have changed significantly. Porter (2001) argues the exact opposite, stating that because the Internet tends to weaken industry profitability without providing proprietary operational advantages, it is more important than ever for organisations to distinguish themselves through strategy. Indeed, he suggests that Internet technology provides better opportunities for businesses to establish distinctive strategic positioning than previous generations of IT. He suggests that the Internet influences industry structure in the following ways:

Threat of substitutes

- Internet can expand the size of the market by making the overall industry more efficient
- Proliferation of Internet approaches creates new-substitute threats

Buyers

- Eliminates powerful channels and improves bargaining power
- Shifts bargaining power to end-consumers
- Reduces switching costs

New entrants

- Reduces barriers to entry
- Flood of new entrants
- Technological advances do not stay proprietary but are easily copied

Suppliers

- Gives access to more customers

- New channel without intermediaries; so reduced costs
- Equal access to all suppliers through e-procurement and new e-markets
- Reduced barriers to entry

Competitors

- Reduces differences in offerings
- Migrates competition to price
- Widens the geographic market and number of competitors
- Lowers variable costs relative to fixed costs and increases price discounting

All of these may be viewed as positives or negatives depending on your current position in the marketplace, your role (you could be both a buyer and supplier) and your future strategy for the market space. What is an advantage for one is also likely to be a disadvantage for, or a threat to, another.

Porter suggests six principles of strategic positioning:

1. Start with the right goal — superior long-term return on investment
2. Deliver a value proposition or set of benefits different from your competitors
3. Configure a distinctive value chain, do things differently
4. Identify "trade-offs." You cannot do everything — choose to do only those you do best and where you are unique
5. Ensure all activities are mutually reinforcing and employ the concept of "fit"
6. Maintain continuity of strategic direction — do not continually reinvent but continuously improve

Porter unambiguously believes that the companies that will be the most successful will be those that are established and use Internet technologies to make traditional activities better, implementing new combinations of virtual and physical activities that were not previously possible.

In the next section we will look at some other strategic approaches that have been suggested for these new complex markets.

Role of information systems

IT as a strategic resource

In recent years, the role of IT within organisations has changed significantly as more and more organisations have built and used SIS. (That is why we call the present period the SIS era). Many organisations

have recognised that IT offers the capability to redefine the boundaries of markets and structural characteristics, alter the fundamental rules and basis of competition, redefine business scope, and provide a new set of competitive weapons. It is, therefore, imperative that the traditional role definition of IT be changed to reflect a more central, strategic role for IT within management. This emerging new role of IT within organisations is the result of two concurrent and perhaps equally powerful forces, **technology push** and **competitive pull**.

The "technology push" force has emerged partly because of significant improvement in the price-performance ratio of IT and partly due to increased connectivity capabilities over time. The other force, "competitive pull," has emerged because markets are becoming highly competitive and the traditional sources of competitive advantages are diminishing as competitors strive to attain parity with one another.

Often there is a need to distinguish between strategic use of "information" and strategic use of "information technology." Some organisations have used IT to achieve strategic objectives taking advantage of technological advances (King, Grover and Hufnagel, 1989). For example, suppose an organisation determines that relations with its customer enterprises could be strengthened by placing computer terminals in each customer location, facilitating order placement as well as providing a means of advance price and availability checking. While this information was previously made available to customers by phone on request, it is now provided instantly via telecommunication links. Customers are thereby "tied into" the firm in a way that makes it more difficult for them to change suppliers. In this case, it is the information technology and not the information itself (since the same information was available previously) which is the key factor in achieving improved customer relations (and thus meeting the firm's strategic objective).

Many organisations do use information itself, rather than IT, as a strategic resource. For instance, an organisation might have a strategy of expansion through acquisition of related businesses. Having identified criteria for evaluating potential acquisition, the organisation now scans a commercial database to identify acquisition prospects that meet the criteria. In doing so, they are using new information or using available information in new ways to widen the range of firms that are considered and to make better strategic acquisition choices. In this case, therefore, it is the use of important new information or of available information in new ways that is the key to success.

Although IT facilitates the processing of this information, the strategic advantage does not come from IT (as in the earlier case). The primary distinction between these two approaches lies in the source of the added value. In the first example, the introduction of IT increased the value of existing information by providing easier and faster access. In the second, the information itself provided a strategic advantage through the new uses to which it is put. In some situations, both IT and information can be used as a strategic resource. For example, an airline (such as American Airlines) already pursued the use of IT by putting computer reservation terminals into travel agencies. Then it began to use the detailed

information that it thereby obtained on supply and demand for various routes to manage optimally the availability of low-price seats on each of its flights. This efficiency ensures that it will capture much of business travellers' demand for high-priced unrestricted tickets while also filling otherwise empty seats with low-priced tickets that are sold with restrictions of timing, penalties for changing reservations, and so on. (This strategy is now called **yield management** by airlines.) In these ways, the airline used both IT and information for getting strategic advantage.

Technology as the enabler of e-business

It is generally accepted that systems strategies do not typically begin from a starting point of technological capability. It is more usual to define the business problem or objective, and then cast around for tools to reach that objective. In the case of e-business, however, traditional thinking appears to drop by the wayside at times. E-commerce applications and integration within new business paradigms or models are not necessarily like other systems.

In many cases e-business applications are simply technical fixes to identified business ends, as in the case of:

- Electronic Data Interchange used to process large batches of routine invoices and payments; and
- Internet solutions used to replace telephone sales as a way of taking orders from customers.

But for many companies looking at the opportunities of e-business, it isn't the existence of the technology that creates the business opportunity. It changes an existing market's profitability or defines a new market. As business strategists intending to develop e-business systems, we must know what these technologies are and what technology can do. The three technologies at the base of it all are:

1. **Electronic Data Interchange (EDI).** This is the automated transfer of data between computer systems according to agreed structured messaging formats. This process, although expensive to install and maintain (requiring the leasing of proprietary software and private network facilities), has streamlined supply logistics for large businesses. It has decreased trade cycle times and the cost of stock, and provided a high base standard for inter-organisational systems. It is pulling smaller companies into e-communications because they benefit by linking in with these systems.
2. **Electronic markets.** This is an emerging opportunity for firms to redefine the way they look at competition and cooperation, as electronic markets are bringing together competitors in trading systems that provide mutual advantage.
3. **Internet-enabled e-commerce and e-business**. The new reach of business to consumer trade (B2C) and increasingly effective supply chain transactions (Business to Business, or B2B) using

Internet tools is arousing intense espousal and intense distrust. There are those who see a new economy dawning with different rules of business applying to the Internet economy, and others who see the whole thing as a creation of a few journalists and market entrepreneurs making money out of a gullible public. Whatever your view, the increasingly powerful and inexpensive tools of computing and the public Internet are making a range of opportunities materialise, and no business strategy can afford to overlook their potential.

The three areas above indicate strategic constructs underlying the rest of this course, and they translate into e-business applications by means of strategic planning which is detailed in the remaining units of this course. For each business situation, the results are different, but the ten elements below indicate a mixed bag of desirable outcomes that corporations and other entities seek because of their individual needs and circumstances:

1. **Product promotion**: Web sites are increasingly adopted as sophisticated alternatives to paper-based product promotion and information media. Unlike mass marketing tools, Web pages can be customised and created on the fly for different customers and enquirers.
2. **New sales channel**: Many have attempted using the Internet as a new sales channel, often finding that channel conflict and other problems defeat the efficient use of this channel. Although the advantages of not needing physical space near a buyer is tempting, the efficient model for this modern mix of telesales and direct marketing has yet to be demonstrated for all categories of goods and services. Perhaps it may never be as important as its advocates suggest, yet it will be an increasingly important component of any marketing mix.
3. **Direct savings**: Online sales have the potential to cut space and staff costs through the use of publicly accessed networks. Increasingly capable and reliable systems are allowing demonstrated efficiencies to arise, particularly in B2B commerce, although B2C commerce has yet to find its feet in this area.
4. **Time to market**: Important cost-cutting measures include speeding up the time to market of goods, then achieving an efficient order replenishment cycle. We shall be looking closely at examples under the headings of supply chain management.
5. **Customer service**: E-business tools, such as Internet-driven call centres, can provide an information-rich environment for customers and provide for enhanced relationships. This is specifically addressed below under Customer Relationship Management (CRM) initiatives.
6. **Brand image**: Some believe that the Internet gives a new direction and importance to brand management, but this benefit has yet to be demonstrated, as much research shows that brand positioning transfers from offline to online activity better than in the other direction.

7. **Organisational learning**: While putting new systems in place, enterprises have the opportunity to capture and order organisational knowledge and skills as never before.
8. **Product development**: The information-rich interactions that are now possible between manufacturer and user are now providing information that can direct the research and development of new products. The hold of traditional intermediaries is being redefined.
9. **New business models**: If strategic planning is to grasp the potential of new tools and create a new e-business environment, it must seek to identify new business models for the development of overall strategies. Just as a start-up business has more channels to market through e-business, so existing businesses have an opportunity to redefine themselves and restructure.

Challenges of information systems

The new economy, the Internet economy and e-business

The e-economy

In this new millennium, there is a general feeling that things have changed, that there is a new social and economic reality. In particular, this expectation applies to the world of business, transformed as it has been by a number of powerful forces such as globalisation and the advent of the Internet. There is a sense that the world of business is significantly different from its state just 20 years ago. This perspective gives rise to terms such as "new economy," "information economy," "digital economy," and so on. These terms suggest, rather imprecisely, that we have a new business reality, and that the role of ICT and the Internet are significant features, perhaps even defining features or characteristics of that new business reality.

Two broad constructs help to structure and make some sense of this new reality if they are defined and thought about clearly: namely the "new economy" and the "Internet economy." This module introduces these notions as fundamental constructs for the rest of the course. There is a sense in which trends such as globalisation and the effective use of increasingly more powerful and reliable ICT have transformed the national economies of the U.S. and Europe to such an extent that when referring to, say, the contemporary U.S. economy, we could meaningfully talk about something called the "new economy." A separate construct refers to the economy that is clustered around the Internet and the new electronic commerce or e-business phenomenon.

Finally, there has been a significant restructuring of organisations, since e-business intensifies collaborations among multiple organisations with several complex economic, strategic, social and conflict management issues as well as major organisational and technological factors. This new business paradigm is one where:

- core business processes may need to be rethought and redesigned,
- new organisational forms and inter-organisational forms may need to be developed, and
- the emphasis will be on collaboration rather than competition within the virtual market.

The most fundamental elements of doing business are changing and a totally new business environment is emerging, thanks to such phenomena as:

- The World Wide Web
- Mass customisation
- Compressed product life cycles
- New distribution channels
- New forms of integrated organisations

In such an environment, responsive organisations quickly become "virtual" because the costliest parts of their infrastructure no longer lend themselves to measurement by height, length, weight, or other physical dimensions. Such organisations will have a considerable impact on all aspects of business strategy in the 21st century. This module examines the World Wide Web and the other mentioned phenomena and sets the scene for the remaining modules where you will explore the nature and rationale of e-business markets, new e-business models and strategies for "co-opetition,"[1] and strategies for designing, transitioning and managing ICT -driven business opportunities.

The new economy

You may ask what economic rules prevail in the "new economy." There was speculation that the sustained boom in the U.S. economy in the late 1990s and early 2000s (as instanced by increased corporate earnings and profits, low unemployment, relatively high productivity, low inflation and a soaring stock market) has made that economy "new," in the sense that some of the old economy rules and principles no longer apply, at least with the same force. Amidst such speculation is a view that stronger productivity growth also allowed the U.S. economy to grow faster without inflationary pressures during that period.

There is also the view that in the short run, a trade-off between inflation and unemployment has changed so that low unemployment and low inflation can coexist. Other speculation looks at the sources of growth in

[1] A term coined by Novell founder Ray Noorda, "co-opetition" was originally used of a business co-operating with its competitor. The term has been elaborated to mean business strategies preferring win/win over win/lose outcomes.

the U.S. economy and identifies factors such as computerisation and globalisation as driving forces changing the nature of the old economy.

Connected to the pre-eminent role given to IT and its potentially transforming power has been the important role given to knowledge as a new form of capital, along with the roles of knowledge management, research and innovation, as factors creating wealth.

Another feature of the "new economy" is the increasingly important role of the service sector. Indeed, Pine and Gilmour (1999) see the "service economy" evolving into what they call an "experience economy." They trace the evolution of economies from an agrarian-based economy through an industrial economy through to a service economy and thence to the emergence of an experience economy. Each economic stage has all the elements of preceding and succeeding stages, but the focus and emphasis is different. The contemporary economies of the developed world can be seen to be new in terms of their emphasis on producing and delivering services and the emerging idea of staging complete experiences for consumers.

Of course, modern new economies examined along this plane are only different in degree from the older economies of 20 years ago, but this difference in degree could be seen as a "strand of newness" in the "new economy." As you already notice, the nature of the new economy has many and varied aspects of novelty. Throughout the course, your readings will show that these are given different degrees of emphasis by different thinkers.

Economists are examining the new IT-based organisations and the economic world they shape but have come to no agreement yet on whether there are new economic laws to be discovered, or whether the old economy macroeconomic principles and technical relationships still apply. For some it is a given that, while technology may change, economic laws do not. Perhaps no definite views are yet possible. As you will see, the potential for new business and organisational forms resulting from a still-developing set of technologies has yet to be properly mapped out, and we are all still learning.

> *The term "information economy" has come to mean the broad, long-term trend toward the expansion of information and knowledge-based assets and value relative to tangible assets and products associated with agriculture, mining, and manufacturing. The term "digital economy" refers specifically to the recent and still largely unrealised transformation of all sectors of the economy by the computer-enabled digitisation of information.* (Brynjolfsson and Kahin, 2000)

The Internet economy

There is, however, another definition of the "information economy" or "digital economy," as the "Internet economy." This notion revolves around the set of Internet-based organisations, the "dot-coms" and others

involved in e-commerce. An explicit characterisation of the "Internet economy" is provided by a group of researchers at the University of Texas at Austin's Centre for Research in Electronic Commerce. They view the "Internet economy" as those firms engaged in e-commerce together with those firms that provide, implement and maintain the infrastructure for e-commerce.

They see the "Internet economy" as a structure with four layers:

Layer 1	The Internet Infrastructure Indicator
Layer 2	The Internet Applications Infrastructure Indicator
Layer 3	The Internet Intermediary Indicator
Layer 4	The Internet Commerce Indicator

Layer 1. The Internet Infrastructure Indicator

This consists of the telecommunications companies, Internet Service Providers, Internet Backbone Carriers, "last mile" access companies, security vendors and manufacturers of end-user networking equipment, all of which are prerequisites for the Web and proliferation of Internet-based electronic commerce. Examples of companies include Cisco, Lucent, Dell, Qwest, AOL, Axent and Corning.

Layer 2. The Internet Applications Infrastructure Indicator

This consists of the software products and services necessary to facilitate Web transactions and transaction intermediaries. It includes the consultants and service companies who design, build and maintain all types of websites from portals to full e-commerce sites. Examples of companies include Netscape, Microsoft, Adobe, Scient, Sylvan Prometric, Opera, Oracle and Macromedia.

Layer 3. The Internet Intermediary Indicator

This consists of intermediary services such as Web development, electronic market makers or market intermediaries. Essentially they facilitate the meeting and interaction of buyers and sellers over the Internet and act as catalysts in the process through which investments in the infrastructure and application layers are transformed into business transactions. Examples of companies include VerticalNet, E*trade, TravelWeb.com, Zdnet, Yahoo and Doubleclick.

Layer 4. The Internet Commerce Indicator

This consists of all the companies conducting e-business across a wide variety of vertical industries (excluding those already included in Layer 3). Examples of companies include e-tailers, manufacturers selling online, free-subscription-based companies, airlines selling online tickets, online entertainment and professional services.

These four layers comprise a complete e-economy with characteristics such as inputs, outputs, size, value added, efficiency and labour

productivity. Table 1.2 shows the growth experienced in each layer from 1998-1999 and overall revenues in USD billions.

	1998 percentage growth	1999 percentage growth	Growth overall
Layer 1	27	40	50
Layer 2	14	22	61
Layer 3	11	17	52
Layer 4	16	37	127
	64	108	68
Annual revenues	$301	$507	

Table 1.2 Growth versus overall revenues.

E-business

One spectacular aspect of the transforming role of ICT in business has been the rise of e-business that has followed the advent of the Internet. The Internet has meant that business organisations have been connected to both other business organisations and to mass markets of consumers via computer networks. Worldwide, there are more than 400 million people connected to the Internet, over 150 million of these in the U.S. This connectivity has allowed goods and services to be bought and sold over computer networks. In the case of digital goods, these goods (including music, software and text) can be bought, sold, and distributed over the Internet. With other goods and services, the goods are purchased and paid for over the Internet and distributed by logistics carriers to business addresses and consumers' homes. Such online buying, selling, and paying for goods and services constitute electronic commerce or e-business.

The emergence of e-business has led to dramatic redefinitions of the nature of an organisation. Complex business networks working together along the value chain are defined by their ability to get products to market with the widest range of consumers at the cheapest cost and fastest speed. This, in turn, has led to a completely different set of problems for the management of such structures with complex interrelationships, changing paradigms for intermediation, and an emphasis on collaborative competition. Today a business executive needs to have a framework for understanding such relationships in order to evaluate strategic opportunities in the global market place.

We have found that in Information Management projects, where there is a need to analyse or construct large systems, it is useful to structure them as a hierarchy of several levels in which the lower ones provide the support platform for the higher. In the case of e-business supporting inter-organisational systems, such a hierarchy may usefully be viewed as displayed in the table below:

Meta Level	Level	Function	Examples
Products & Structures	7	Electronic Marketplaces and Electronic Hierarchies	Electronic auctions, brokerages, dealerships, and direct search markets
			Inter-organisational supply chain management
	6	Products & Systems	Consumer services over distance – retailing, banking, stock broking
			Information and entertainment on demand: educational services, fee- based content sites
			Supplier-customer linkages
			Online marketing
			Electronic benefit systems
			Intranet & extranet collaboration
Services	5	Enabling Services	Online catalogues, directories, smart agents
			Smart card systems, e-money
			Digital authentication services
			Digital libraries, copyright protection services
			Traffic audit
	4	Secure Messaging	EDI, Electronic Funds Transfer, e-mail
Technology-Based Infrastructure	3	Hypermedia/Multimedia Object Management	World Wide Web with Java
	2	Communications Utilities	Value Added Networks and Internet
	1	Wide Area Telecommunications Infrastructure	Guided and Wireless Media networks

Table 1.3 Hierarchical framework of e-commerce

We can use this table to view the e-business as made up of three levels:

1. Technology-based infrastructure: the hardware and software making up the ICT to deliver functionality over networks
2. Services: all messaging activities
3. Products and structures: the provision of goods and services together with intra- and inter-organisational information sharing and the creation of electronic supply chains and marketspaces. Let us look at these in a little more detail.

Technology-based infrastructure

Supporting this framework are three basic levels. The first is the global network of telecommunications networks linking public and private networks through a computer-controlled switching system. The potential for inter-organisational strategies extends as far as the reach of these media. Differences in regional and national penetration of these networks is, and will be for the foreseeable future, a result of government policies, funding and control strategies together with private sector belief in their profitability.

ICT capabilities are made available for business use in two important ways. The first available system was that of privately constructed and leased networks, the Value Added Networks (VANs). These were constructed to make available services over and above those offered by the common carriers (then almost entirely state-run and regulated monopolies, created for voice transmission) and to make a profit in the process. The second has arrived with the development of the Internet from a government-sponsored and research medium into today's principal inexpensive vehicle for e-business.

The separate software-based layer of the Internet known as the World Wide Web has resulted in the possibility of a single distributed, worldwide, hyperlinked database with password-protected and private networks (intranets and extranets) linked to it. The Web is a medium for the distribution, presentation and sale of information-based objects. As a platform-independent service it has been enhanced by recent developments in platform independent programming languages, such as Java, further enhancing its utility. Nevertheless, don't overlook the fact that as a separate and software-based layer, the Web can and may be replaced in the future by an information management mechanism that would better meet the demands of very large-scale use of the global network of networks.

Services

The service level provides for the transfer of messages and enabling services for business. Using a suite of protocols developed for the free sharing of information, this level is robust and inexpensive. The downside is that, unlike proprietary EDI systems, this level lacks such features as inbuilt security, confidentiality, authentication and similar services demanded by commerce.

This issue is currently being addressed by such means as cryptography, Internet tunnelling, and the development of protocols such as the Secure Electronic Transaction (SET) layer issuing from credit-card companies.

Email is the most pervasive tool of the Internet and a cost-cutting measure that is generally the first to be appreciated by business. While issues of email contracts, confidentiality, evidentiary value and such like are yet to be fully resolved, this tool is expected to retain its prime position in the business repertoire.

More activity is under way in the area of enabling services — tools for searching, price comparison, and customising information delivery and receipt, together with electronic money initiatives and e-banking. This service area is changing so rapidly, no written commentary could be up to date. You are advised to conduct Web searches on topics of particular interest throughout this course.

However, this is a good place for examining the possible implications of e-money. E-money in its various forms is expected to become a substitute for credit and debit instruments and also for bank notes and coins at

considerable expense to the handling agencies such as banks, finance houses and government-controlled agencies.

E-money has considerable social implications beyond this, since it does not have the obvious anonymity of cash. There are also the security and legal implications and, of course, the auditing and tax implications of electronic transfers. Within the global context we must also recognise that the majority of consumers are not currently Web-enabled and so there may be far-reaching implications for social and economic reform in the less-developed countries of the world.

Products and structures

In early 2000 a lot of interest and publicity surrounded consumer-oriented applications of e-business. Companies such as Amazon (booksellers), Dell (computer retailers), CDNow (music sellers), Discover Brokerage Direct (securities transactions) and Security First National Bank (banking services) are frequent visitors to the business and popular press. In terms of traditional profit over earnings (P/E ratio), none of these firms is exciting, yet their market capitalisation during 1999/2000 suggested that Internet-based stocks were perceived, rightly or wrongly, as gaining value in other ways. (This is despite the dot-com crash of 2000/2001 which can be viewed as a necessary market correction).

Alongside the overtly commercial sector, information for entertainment purposes (infotainment) on demand is another growing sector. From news corporations (CNN, The Times of London, and so on) to Web versions of paper magazines (Hotwired) and purely electronic journals, magazines and newsletters, the Web is awash with information available in both push and pull formats. The boundaries of information and entertainment are blurring, as are those between commercial and not-for-profit sites. Unfortunately, while enthusiasm and experimentation are rampant, no clear models for success have yet emerged.

The linkages between businesses (B2B) and between business and consumer (B2C) along the traditional supply chain are perhaps clearer, as well as being the fastest-growing area of e-business. This exciting area is attracting the most attention as new configurations of the supply chain model are enabled by ICT, giving rise to the pervasive practice of implementing intra and inter-organisational networks to fashion new supply chains and giving rise to the new organisational forms which will be discussed throughout this course.

E-business impact

Although it captures public attention, the use of electronic tools and Internet technologies to sell and promote commodities to end users is in its infancy. Business-to-Consumers transactions, or B2C trading still constitutes a very small proportion of the total economy, whichever way it is measured. Figures from the U.S. Department of Commerce show that for the third quarter of 2012, online retail sales in the U.S. amounted to USD 57 billion, an increase of more than USD 51 billion from the same

period in 2000 (which represented only 0.78 per cent of total retail sales at that time). Thus, whatever the significance of e-commerce, it was not significant because of the size of the phenomenon. Furthermore, in terms of remote shopping, we have had TV shopping and catalogue shopping well before the turn of the century, but it could be argued that these forms of retailing, although similar to Internet-based retailing, captured public imagination and media attention much less than online retailing. Just why this is the case is not easy to pin down, but computers have always been seen as a modern or avant-garde technology. Many would argue that professional investors and venture capitalists' imaginations have also been captured by the new e-commerce possibilities. Many spectators of this phenomenon have watched with amazement as investment dollars have poured into the "dot-coms" or Internet-based retailers and service providers, even as these companies continue to make not solid profits but rather steady losses.

After several years of hype and gravity-defying stock prices, this particular unreal strand of the "new economy" seems to be taking a sudden and stern correction toward reality and sobriety. In fact, at the beginning of 2001, the question was whether the reaction to the "dot-com" excesses of the so-called "new economy" would in fact be an over-correction. It could punish not only lacklustre dot-coms with little or no business performance but also some apparently healthy and indeed innovative technology-based firms.

Regardless of how we view the future of the new economy it is undoubtedly true to say that e-business is here with us now and the most fundamental elements of doing business are changing and a totally new business environment is emerging. This no longer comprises the online "born-on-the-net" organisations and others who are migrating their businesses to participate in online markets. The market now facilitates the emergence of e-consortia where groups of organisations are allied together to create a stronger online force. Within these groupings, organisations may choose to focus on different categories normally classified as Business to Business (B2B), Business to Consumer (B2C), Business to Government (B2G) and Business to Employee (B2E).

We will look at more detailed categories of these in the next section.

Strategic applications of IS and e-business

Business-to-Business (B2B)

As stated in the previous section, most of e-commerce falls into this category as does the use of IS and ICT for inter-organisational systems (IOS) transactions and electronic transactions between organisations. Many organisations still use EDI systems to facilitate these transactions within a specific industry group. The growth of the B2B market has resulted in the creation of e-hubs or B2B hubs where businesses can purchase multiple components from multiple suppliers. These hubs can also be referred to as portals and fall into two types – the vertical portal (also known as vortal) specialising services across several industries and the horizontal portal (sometimes described as a hortal) providing a set of services across a single industry.

How Businesses Buy	Operating Inputs	Manufacturing Input
Systematic Sourcing	MRO Hubs • Horizontal Markets that enable systematic sourcing of operating inputs • for example ProcureNet	Catalogue Hubs • Vertical markets that enable systematic sourcing of manufacturing inputs • for example PlasticNets.com
Spot Sourcing	Yield Managers • Horizontal markets that enable spot sourcing of manufacturing inputs • for example CapacityWeb.com	Exchanges • Vertical Markets that enable spot sourcing of manufacturing inputs • for example e-steel

Table 1.4 Portal Classification (Kaplan and Sawhey, 2000)

Kaplan and Sawhey (2000) further distinguish these groupings into four classifications, first by classifying purchases into manufacturing inputs or operating inputs and secondly by classifying how products and markets are bought. Manufacturing inputs are usually highly specialised and so tend to be sourced from vortals, whereas operating or maintenance (MRO) inputs are more general and frequently sourced from horizontal portals. Companies will also have different sourcing strategies either through systematic sourcing, which implies long-term negotiated

contracts, or spot sourcing where the aim is to fulfil an immediate need at the lowest possible cost.

Each of these B2B categories operates in a different way and has a very different array of products, services and players. We will look again at these different markets in Module 2.

Business-to-Consumer (B2C)

These are retailing transactions with individual shoppers such as those offered at Amazon.com. These can offer a variety of different services for consumers such as information updates, comparison shopping, online chats and consultations. Increasingly these sites focus on customer relationship management – offering customers information-rich services and developing e-communities. This is a very important aspect we will return to in Modules 2 and 6. E-businesses need to differentiate their products, and creating added value on their site is one of the most important strategies they can adopt. Check out www.familywonder.com for an example of how these B2C sites evolve.

Such consumer-driven sites are not restricted to B2C but can also be C2C or even C2B. Typically these sites may be auction sites where consumers are selling their property (such as cars) directly to the consumer; mirroring classified adverts in newspapers (see www.classified2000.net).

Individuals will also sell products or services to businesses, such as their own skills for employment or consultancy work.

Business-to-Government (B2G)

Many businesses supply services to government and government agencies. Increasingly they interact through a two-way e-procurement process where a government portal will offer contracts for goods and services and electronic tenders will then be returned by the businesses. We are also seeing the emergence of e-government, as government works to deliver its services to citizens online. Increasingly, governments see the web as the basis for more effective distribution of community services, and countries such as the United Kingdom have invested significant resources in government online.

There has also been a flowering of third-party providers of e-government services such as Communities Online http://www.communities.org.uk/, a U.K. organisation providing ICT support, networking and advice to community groups, government and public sector organisations, voluntary bodies and projects concerned with bridging the digital divide. It has played a major part in disseminating good practice, running online forums and developing links with community networking bodies worldwide. This whole area raises issues such as equity of access to social services, digital divides (the haves and the have-nots in relation to Internet access across the world) and even questions relating to the

desirability of e-democracy as electronic voting becomes a real possibility.

Business-to-Employee (B2E)

Here we refer to all the intra-business activities usually provided on intranets. These may involve exchange of goods or services, information dissemination, online training and staff development programmes or community building exercises. Typically these are restricted to authorised employees and are specific, corporate and proprietary. However, e-business networks have affected the scope of intranets. Typical intranet activities are being extended to extranets to allow sharing in authorised groups from collaborating companies. Increasingly, these activities are being extended into the realm of knowledge management with greater empowerment of information workers and the development of a learning organisation. An example of this is the Knowledge Curve Intranet developed by Coopers and Lybrand as a service to company consultants and corporate tax professionals. It was then integrated with the Tax News Network (TNN), an extranet for tax consultants providing an interactive information source on the constantly changing tax laws and regulations. This is available to 75,000 employees and consultants worldwide through a Lotus Notes Domino system.

E-business networks

These very different business models – B2B, B2C, and so on – are all opportunities that can be pursued by an organisation wishing to exploit IS for competitive advantage. These systems transcend normal organisational boundaries and encompass both intra and inter-organisational systems. Increasingly we see networks of organisations interlinked with each other. Boundaries are fluid, and economic value behaves very differently. Sawhney and Parikh (2001) suggest that there are four new value propositions that should be considered in the digital economy:

- Value at the ends – the value will come from the end closest to the customer
- Value in common infrastructure – sharing ICT, business processes and services across organisations
- Value in modularity – developing “plug-in” modules across all the activities above so that they can fit easily into as many business value chains as possible.
- Value in orchestration – coordination will become the most valuable business skill

Planning and managing such systems requires an integrated multi-dimensional approach across the e-business and the development of new business process models. The models are not mutually exclusive. However, selecting appropriate business models requires an organisation to assess its core competencies and develop an appropriate strategy in the e-marketspace. One such approach is for organisations to analyse the

chain of activities which they commonly perform and the relationships they have with other organisations along this chain. This is commonly described as the Value Chain, and we will explore this concept in some depth in Modules 2 and 4 when we look at a number of proposed approaches to the development of the strategy-focused organisation.

Module Summary

Summary

In this module you learned the basic definitions you need for understanding the concepts of MIS and the impact of IT on the new e-business environment. Some of these concepts may still appear to be strange to you. This is a typical example of a co-operative initiative to develop a single trading portal for a national community. These problems are typical of new e-business initiatives. We also direct you to useful websites where you can get international statistics and global reports.

In the following study modules you will be looking in detail at how you might develop an MIS strategy for your own organisation, how you can develop global information systems and conduct e-business in the global marketplace and how IT will transform your organisation. You will also be considering the skills you need to manage this transformation.

Assignment

Assignment

1. A bank decides to provide access to any three of a customer's accounts through its automatic teller machines to its customers, so that with these accounts they can transfer, withdraw or deposit money. Would you classify this as an IS strategy or IT strategy? Why?
2. A garment manufacturing company has the strategic goal of "no stock outs." It has many retail outlets distributed throughout Asia. Their outlet counters have POS terminals connected to their central computer system. They track the movements of various products from different retail outlets and decide "outlet stock replenishment strategy" for each individual outlet based on the movement of products, so that the fast-moving items are never out-of-stock. What would be the impact of this inventory tracking on the organisational strategy? In which "era" should the company be placed?
3. Establishing an e-business is a fairly complex venture and involves many considerations such as international legislation, taxation and legal jurisdictions. To get some idea of these issues, let us assume that you are interested in establishing a trading centre in Hong Kong; go to www.offshore-e-com.com and search for Hong Kong. You should review all the information provided on this site and then answer the following questions:

    a. What is Digital 21?
    b. What is the Cyberport and who are the players?
    c. What are some of the main reasons why a company would locate their e-business in Hong Kong?

    Briefly review how Hong Kong compares against Bermuda with respect to tax-efficient e-commerce, against Andorra for facilities and against Cyprus for facilities. Rank these four centres as effective e-commerce offshore bases.
4. Search the Web for locally based examples of each of these four different business models (B2B, B2C, B2G, B2E). See if you can identify the answers to the following questions:

    a. How many alliances are involved in the model?
    b. Who are the key players?
    c. What services are offered?

    Select an example of a B2C model operating an online store (if you can't find a local one then we suggest you try a well known international site such as Amazon.com). Evaluate this site against the three questions above and then consider:

    a. Is there a specific business strategy driving this online store?
    b. What strategies could you suggest for the future?
    c. What alliances might they develop?

Case Study Reading 1.1

Case study

Case Analysis – CargoNet Transportation Community Network Limited. Centre for Asian Business, The University of Hong Kong.

Turn to the case study reading for this module. You should read this thoroughly and then investigate their website before you answer the questions.

CargoNet Transportation Community Network Limited http://www.arena.com was established in 1994 with the aim of developing e-commerce services tailored to the trade and transport community in Hong Kong and southern China. This is a typical example of a cooperative strategy, in this case between HIT, EDS, CSSL, Traxon Asia, Kenwa and Haffa. You should examine their site and identify what each of the joint partners provides to the strategic alliance.

What is the key resource that the company is selling? How would you advise them for future strategy?

Assessment

Assessment

1. Identify the major functions within a functional area (for example, finance, human resources, or marketing) within your own organisation, or department if your organisation is very large (such as the government or a bank).
2. Describe the business (enterprise) functions and the major processes and procedures within that functional area. Identify what MIS exist (if any) to support these areas.
3. What are the business drivers that are shaping modern business environments? What is the nature of these business drivers or pressures and what are their effects on contemporary business organisations?
4. What is meant by the terms: New Economy, Information Economy, Digital Economy, and Internet Economy? What are the characteristics of the above economies? Do these economies exist to the same extent in the westernised world and less developed economies? What differences are there and how does this impact on business strategy?

References

Broadbent, M., Weill, P., & St. Clair, D. (1999). *The Implications of Information Technology Infrastructure for Business Process Redesign*, MIS Quarterly, June 159–82.

Burn, J. M., Marshall, P. & Barnett, M. L. (2002). *E-Business Strategies for Virtual Organisations.* Butterworth Heinneman.

Damsgaard, J. & Farhoomand, A. F. (1998). CargoNet Transportation Community Network Limited. *Centre for Asian Business*. The University of Hong Kong.

Davenport, T.H. (1997). *Information Ecology: Mastering the Information and Knowledge Environment*. Oxford University Press, New York.

Davidow, W. S. & Malone, M. S. (1992). *The Virtual Corporation: Structuring and Revitalising the Corporation for the 21st Century*. New York: HarperCollins Publishers.

Deise, M. V., Nowikow, C., King, P. & Wright, A. (2000). *PriceWaterHouse Coopers Executive's Guide to E-Business (From Tactics To Strategy).* John Wiley & Sons.

Dickson, G., & DeSanctis, G. (2000*). Information Technology and the Future Enterprise: New Models for Managers*. Prentice Hall New Jersey.

Foster, M. J. (1993). Scenario planning for small businesses. *Long Range Planning, 26*(1): 123–29.

Goldman, S.L., Nagel, R.N. & Preiss, K. (1995). *Agile Competitors and Virtual Organisations: Strategies For Enriching the Customer*, Van Nostrand Reinhold, New York, USA.

Greiner, R. & Metes, G. (1996). *Going Virtual: Moving Your Organisation into the 21st Century*. Englewood Cliffs, N.J: Prentice Hall.

Igbaria, M (1999). The Driving Forces in the Virtual Society. *Communications of ACM, 42*(12).

Kaplan, R. S. & Norton, D. P. (2001*). The Strategy Focused Organisation*, Harvard Business School Press.

Kare-Silver, M. de (1998). *Strategy in Crisis: Why Business Urgently Needs a Completely New Approach*. New York University Press, New York, USA.

Kare-Silver, M. de (1998) *e-Shock- Electronic Shopping Revolution: Strategies for Retailers and Manufaturers*, American Management Association (AMACOM), New York.

Kanter, J. (1992). Business models and information systems architecture. *Managing with Information*, Prentice Hall, 50–73.

Kaplan, S. & Sawhney, M. (2000). E-Hubs: The New B2B Marketplaces. *Harvard Business Review*, May-June, 97–103.

Pine, B.J. & Gilmore, J.H. (1998). Welcome to the experience economy. *Harvard Business Review*, 76(4): 97–105

Plant, R. (2001). *eCommerce formulation of strategy.* Financial Times/Prentice Hall.

Porter, M. E. (1985). *Competitive Advantage*. New York, Free Press.

Seybold, P.B. (1998). *Customers.com - How to Create a Profitable Business Strategy for the Internet and Beyond*. Times Business, Random House, USA.

Shapiro, C. & Varian, H.R. (1998). *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School Press, Boston, USA.

Stiroh, K. (1999). Is there a new economy? *Challenge*. Armonk; Jul/Aug 1999, 82–101.

Tapscott D. (1998). *Growing up Digital: The Rise of the Net Generation*, McGraw-Hill, New York.

Tapscott, D., Lowy, A. & Ticoll, D. (eds) (1998). *Blueprint to the Digital Economy: Creating Wealth in The Era of E-Business*. McGraw-Hill, New York.

van Hooft, F.P.C., & Stegwee, R.A. (2001). E-Business Strategy: how to benefit from a hype. *Logistics Information Management.* Vol 14, No ½ pp 44–53.

Example Reports (web addresses may have been updated)

US Department of Commerce. (1999). *The Emerging Digital Economy II*, Retrieved from: http://www.esa.doc.gov/Reports/emerging-digital-economy-ii

US Department of Commerce. (1998). *The Emerging Digital Economy II*, Retrieved from: http://www.esa.doc.gov/Reports/emerging-digital-economy

US Department of Commerce. (1999). *Falling Through The Net: Defining the Digital Divide*. Retrieved from:

http://www.ntia.doc.gov/report/1999/falling-through-net-defining-digital-divide

OECD (1997, 1998, 2000). *Information Technology Outlook; Electronic Commerce*. Retrieved from: http://www.oecd.org/