A general overview of business information systems, in the function of market recognition

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Abstract

Today we witness the reality of a world that is changing with the rhythm and very high dynamics, in particular in the field of information and communication technology, which has made it possible for the market and the competition in every field of human activity, to develop globally. At the same time, we are aware that technology development provides a chance and opportunity for all, regardless of their location or group affiliation. Thanks to this development of information and communication technology, it has become possible to realize sophisticated Information Systems, which have created opportunities for mass use in almost every sphere of human activity. In this regard, in this paper we have chosen the topic of: A General Overview of Business Information Systems, applied in the function of market recognition. These enables companies to store, create, transform and distribute information and conducting in-depth and complex business data analysis, in order to recognize the market in general, and decision making support to the managers and developers of business planning and marketing strategies!

Keywords: *Business, Information System, Information Technology, Market Knowledge*

Introduction

Computers have been used commercially for over four decades now, in business administration and for providing information. The original intentions, the focus of attention in data processing and the nature of the data processing effort itself have

changed considerably over this period. The very expression describing the activity has changed from the original 'data processing', through 'management information' to the more appropriate 'information processing'.

A great deal of effort has gone into the development of computer-based information systems since computers were first put to work automating clerical functions in commercial organizations. Although it is well known now that supporting businesses with formalized systems is not a task to be taken lightly, the realization of how best to achieve this aim was gradual. The change in views and approaches and the shift in the focus of attention have been caused partly by the rapid advancement in the relevant technology. But the changed attitudes that we experience today have also been caused by the good and bad experiences associated with using the technology of the day. In recent years two other factors have contributed to the general change in attitudes. As more coherent information was made available through the use of computers, the general level of awareness of information needs grew. At the same time the general economic trends, especially the rise in labour cost, combined with the favorable price trends of computer-related technology, *Strategic Information Management* appeared to have offered definite advantages in using computers and automated systems. Nevertheless this assumed potential of the technology has not always been realized.

The 1980s have brought about yet another series of changes. It has become clear that sophisticated hardware and software together can be targeted in different ways towards different types of application areas. New generic types of systems emerged on the side of data processing systems and MIS. Partly, it was realized that the high intelligence content of certain systems can be usefully deployed. Ideas originally put forward by the artificial intelligence (AI) community, which first emerged in the late 1950s as a separate discipline, now became realizable. Systems housing complex rules have emerged as 'rule-based' systems. The expressions 'expert systems' and 'intelligent knowledge-based systems' (IKBS) became fashionable to denote systems which imitate the rules and procedures followed by some particular expertise.

Partly, it was assumed that computers would have a major role in supporting decision-making processes at the highest levels of companies and the concept of decision support systems (DSS) evolved. When remembering the arguments about management information systems, many academics and professionals have posed the question whether 'decision support system' was a new buzz-word with no content or whether it reflected a new breed of systems. Subsequent research showed that the computerized system is only a small part of the arrangement that needs to be put in place for supporting top level decision makers.

Manufacturers got busy in the meantime providing advanced facilities that were made available by combining office systems, computers and networks, and by

employing the facilities provided by keypads, television and telecommunications. Electronic mail systems appeared, teleconferencing and video-text facilities shifted long-distance contact from the telephone, and – besides the processing of data – voice, text and image processing moved to the forefront. The emphasis shifted from the provision of data to the provision of information and to speeding up information flows.

The major task for many information systems (IS) departments in the early 1980s was making information available. The problems of interconnecting and exchanging information in many different forms and at many different places turned the general interest towards telecommunications. As a result of recent technological improvements and changes in attitudes, the role of both data processing professionals and users changed rapidly. More systems were being developed by the users themselves or in close cooperation with the users. Data processing professionals started assuming the role of advisers, supporters and helpers. Systems were being more closely controlled by their users than was the practice previously. A new concept – the information center – emerged, which aimed at supporting end-user computing and providing information and advice for users, at the same time also looking after the major databases and production systems in the background.

The most important result of using computer technology, however, was the growing realization that technology itself cannot solve problems and that the introduction of technology results in change. The impact of technological change depends on why and how technology is used. As management now had a definite choice in the use of technology, the technological choices could be evaluated within the context of business and organizational choices, using a planned approach. For this reason more and more companies started adopting a planned approach to their information systems. 'System strategy' and 'strategic system planning' became familiar expressions and major methods have been developed to help such activities.

It has been realized also that applying information technology outside its traditional domain of backroom effectiveness and efficiency, i.e. moving systems out of the back room and into the 'sharp end' of the business, would create, in many cases, distinct competitive advantage to the enterprise. This should be so, because information technology can affect the competitive forces that shape an industry by:

- building barriers against new entrants
- changing the basis of competition
- changing the balance of power in supplier relationships
- tying in customers
- switching costs, and
- Creating new products and services.

By the mid-1980s this new strategic role of information systems emerged.

From the USA came news of systems that helped companies to achieve unprecedented results in their markets. These systems were instrumental in changing the nature of the business, the competition and the company's competitive position. The role of information systems in business emerged as a strategic one and IS professionals were elevated in status accordingly. At the same time the large stock of old systems became an ever-increasing burden on companies wanting to move forward with the technology.

More and more researchers and practitioners were pointing towards the need for linking systems with the business, connecting business strategy with information system strategy. The demand grew for methods, approaches and methodologies that would provide an orderly process to strategic business and system planning. Ideas about analyzing user and business needs and the competitive impact of systems and technologies are plentiful. Whether they can deliver in line with the expectations will be judged in the future.

Defining data and information

It is important to distinguish between data and information. Data is a raw fact and can take the form of a number or statement such as a date or a measurement. It is necessary for businesses to put in place procedures to ensure data are recorded. For example, to ensure a call canter operator includes the postcode of every customer this can be written into their script and a validation check performed to check these data have been entered into the system.

A common definition of information is that it is data that have been processed so that they are meaningful (Oz and Jones, 2008). This requires a process that is used to produce information which involves collecting data and then subjecting them to a transformation process in order to create information. Some examples of information include a sales forecast or a financial statement.

As stated information is generated through the transformation of data. This can be achieved using a number of different transformation or data processes. Some examples of data processes include aggregating which summarizes data by such means as taking an average value of a group of numbers. Classification places data into categories such as on-time and late deliveries.

Sorting organizes data so that items are placed in a particular order, for example listing orders by delivery date. Calculations can be made on data such as calculating an employee's pay by multiplying the number of hours worked by the hourly rate of pay. Finally data can be chosen based on a set of selection criteria, such as the geographical location of customers.

Although information is an useful resource for individuals and organizations not all information can be considered useful.

The differences between 'good' and 'bad' information can be identified by considering whether or not it has some or all of the attributes of information quality. Attributes can be related to the timing, content and form of the information.

Timeliness refers to that the information should be available when needed. If information is provided too early, it may no longer be current when used. If the information is supplied too late, it will be of no use. Also the information should cover the correct time period. A sales forecast, for example, might include information concerning past performance, current performance and predicted performance so that the recipient has a view of past, present and future circumstances. The content of the information refers to factors such as the accuracy of the information and relevance of the information to a particular situation and user.

The form of the information refers to aspects such as the clarity of the information which should be appropriate to the intended recipient. The recipient should be able to locate specific items quickly and should be able to understand the information easily. The information should also contain the correct level of detail in order to meet the recipient's information needs. For example, in some cases highly detailed information will be required whilst in others only a summary will be necessary.

System definition

System implies a set of interrelated components, with clearly defined boundaries, which interact to achieve a common set of objectives, by accepting inputs and producing results, in an organized process of transformation. The purpose of a system is to transform the received inputs into meaningful outputs. Not every system has a single purpose and often one system contains several sub-objective subsystems, all of which contribute to the overall purpose of the system. For example, the finances, operations, and marketing of an organization must all have their goals, all together helping to achieve the overall corporate objectives. As can be seen, in systems, data is used as inputs to a process that creates information as a product. To monitor system performance, some kind of confirmatory mechanism is required. Furthermore, control should be exercised to correct any problems that are in process and to ensure that the system is meeting its purpose.

A system generally consists of five components, including: input, processing, production, feedback and control.

Basic Functions of a System

- Input - the retrieval and collection of data that enters the system for processing;
- Processing - transformation process which converts the data into results;
- Output - the transfer of transformed elements to their final destination;

Information system definition

An information system means an organized combination of people, hardware and software, communication networks, data sources, rules and procedures.

This system stores, creates, transforms and distributes information in an organization. Components of an Information System include hardware resources, software resources, data resources, network resources, and human resources.

The role of the Information systems is to provide information to management which will enable them to make decisions, which ensure that the organization is controlled. The organization will be in control if it is meeting the needs of the environment. In relation to control, systems can be classified into open-loop and closed-loop.

An open-loop control system is one that has no way of ensuring that objectives are met for a process. This means they are unsuitable in an organizational context because of the complexity of the environment in which organizations exist. Thus open-loop systems will only be successful in attaining a system's objectives in cases where we know with certainty the events that will take place during the system's process.

Closed loop systems can have two types of control mechanism referred to as feedback control and feed-forward control. Feedback control systems generally provide a way of ensuring a system is under control. Negative feedback is when actions are taken to reverse any differences between desired and actual outputs. The weakness of this approach is the potential for delay between discrepancy and the action taken to reduce it. Feed-forward control systems attempt to overcome the time-delay associated with feedback systems by incorporating a prediction element into the control feedback loop. Feed-forward systems are not as common as feedback systems in business settings. Examples include project management plans that are designed to meet time, quality and cost objectives over time.

System Analysis and Design - The five steps

Problem Analysis -Investigate the problem to determine what kind of problem it is. Gather preliminary information about the problem.

Problem Understanding – Accumulate detailed information about the problem by conducting interviews and studying documents, policies and procedures, including those pertaining to existing information systems. Analyze the problems, its technical, organizational, and people dimensions. State exactly what the problem is and what its causes are.

Decision Making – Specify solution objectives. State what the solution should be in precise terms. Typical solution objectives might be more efficient operations, reduced costs, tighter control, higher revenues, or improved decision making.

Consider constraints. Evaluate alternative solutions. Decide which alternative best meets the solution objectives within the specified constraints.

Solution Design– Develop a logical design capturing functional business requirements if the solution requires information systems application. Develop general specifications for how input, output, processing, database, procedure, and control components can meet the requirements of the proposed solutions.

Translate the logical design into a physical design if the solution requires information systems applications. Decide which among several configuration of hardware and software best meets solution objectives given the functional requirements and specified constraints. Develop detailed specifications for input output methods and media, database or file structure, processing logic, manual procedures, and control methods.

Implementation - Implement the solution code, list, and install the system if application solutions (the use of an information system to solve a problem) are required. Make the necessary modifications in procedures and management.

System Life Cycle

The system life cycle is the oldest method for building information system and is still used today for complex, medium, or large system projects. This methodology assumes that an information system has a life cycle similar to that of any living organism, with a beginning, middle, and an end. The life cycle for an information system has six stages

- Project definition
- System study
- Design
- Programming
- Installation
- Post implementation

The life cycle methodology has a very formal division of labor between end users and information systems specialists. Technical specialists such as systems analyst and programmers are responsible for much of the systems analysis, design, and implementation, end users are limited to providing information requirements and reviewing the work of the technical staff.

Formal sign offs or agreements between end users and technical specialists are required as each stages is completed.

Business information systems

With previous definitions of information and systems, we can now define a business information system, as a set of interconnected components, working together to perform data operations such as input, processing, output, storage and control, so that data can be transformed into information that can be used to support forecasting, planning, control, coordination, decision making and operational activities in an organization. In terms of the components that undertake this activity, they can be classified into five basic resources: human, computer equipment, software, communication and data.

Human resources include users and developers of an information system and those who help maintain and operate the system, such as Information System managers and technical assistance staff.

Hardware resources include computers and other items such as printers.

Software resources refer to software and related manuals.

Communication resources include networks, with the necessary hardware and software to support them.

Data resources cover the data that an organization possesses and has access to, such as computer databases and paper files.

In most organizations Business Information Systems (BIS) make extensive use of information technology, such as personal computers. The reasons why computerized BIS have become widespread are evident in their advantages such as speed, accuracy and dependability. They also have a high degree of flexibility due to their ability to be programmed to carry out a wide variety of tasks. There are, however, some disadvantages to BIS such as their lack of creativity that humans possess and the difficulty of incorporating other factors into their decision making such as innovation and intuition.

The basic functions of a Business Information System include: supporting business processes and operations, supporting business decision-making, and supporting strategies for securing business advantages over competition.

Types of business information system

Information systems can be divided into two categories of systems that support an organization's day-to-day business activities and systems that support managerial decision making. **Operations Information Systems (OIS)** are generally concerned with process control, transaction processing and communications.

Management Information Systems (MIS) are concerned with providing support to managerial decision making. Recently this division of BIS into operational and management systems, although useful for managers reviewing the types of BIS in use, does not now accurately reflect the reality of systems used within an organization, particularly with the increased use of inter-organizational e-commerce and electronic data interchange (EDI). For example e-business systems and enterprise resource planning systems are cut across both operational and management systems to provide businesses with more integrated information systems.

Types of business information system

Operations support systems

Operations Support Systems - efficiently process business transactions, control industrial processes, support communication and collaboration, refresh company databases. Some of the types of Operations Support Systems include:

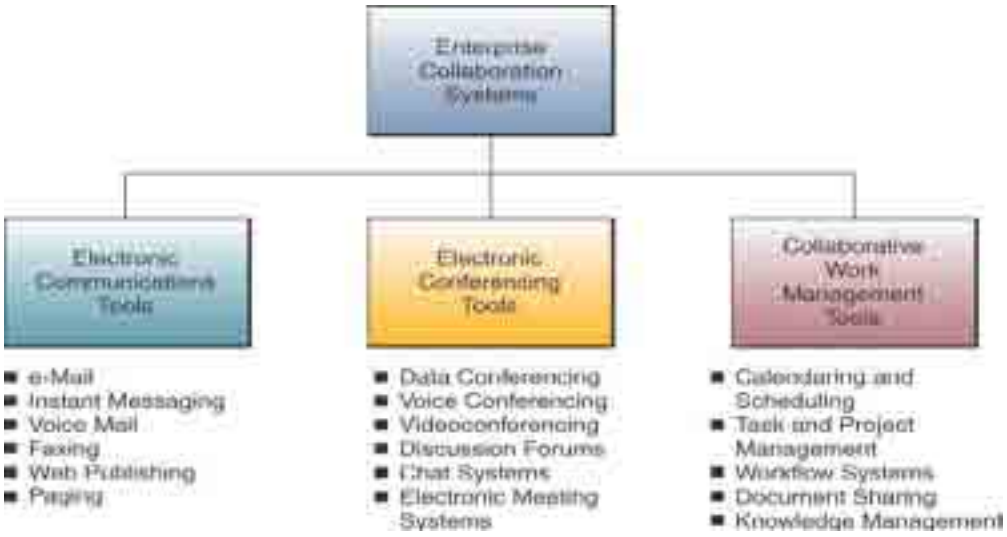
Transaction Processing Systems - record and process business transactions. Examples: sales processing systems, inventory systems, accounting systems.

Process Control System - monitors and controls physical processes. Example: the use of sensors to monitor various processes in the industry.

Enterprise Collaboration Systems (ECS) - ECS are cross-functional information systems that enable teamwork and work groups to enhance communication, coordination and collaboration, facilitate and improve team and inter-group communication.

These systems include - Networked PCs, Servers, Databases and various ECS Groupware (Collaborative software).

Enterprise Collaboration Systems (ECS)



Management support systems

Management Support Systems – provide information in form of the reports, provide direct computer support for managers in decision-making.

Management information system

The purpose of an information system is to collect, store, and disseminate information from an organizations environment and internal operations, to support organizational functions and decision making, communication, coordination, control and analysis, and visualization. Information systems transform raw data into useful information through three basic activities, input, processing, and output.

From a business perspective, an information system represents an organizational and management solution based on Information Technology to a challenge posed by the environment. The information system is part of a series of value adding activities for acquiring, transforming, and distributing information that managers can use to improve decision making, enhance organizational performance, and ultimately, increase firm profitability. Information systems literacy requires an understanding of the organizational and management dimensions of information systems as well as the technical dimensions addressed by computer literacy. Information systems literacy draws on both technical and behavioral approaches to studying information systems. Both perspectives can be combined into a sociotechnical approaches to systems.

The kinds of systems built today are very important for the organizations overall performance, especially in today's highly globalized and information based economy. Information systems are driving both daily operations and organizational strategy.

Powerful computers, software, and networks, including the Internet, have helped organizations become more flexible, eliminate layers of management, separate work from location, coordinate with suppliers and customers, and restructure work flows, giving new powers to both line workers and management. Information Technology provides managers with tools for more precise planning, forecasting, and monitoring of the business.

To maximize the advantages of Information Technology, there is a much greater need to plan the organization's information architecture and information technology infrastructure. Information systems have become essential for helping organizations deal with changes in global economies and the business enterprise. They provide firms with communications and analytical tools for conducting trade and managing business on a global scale. Information systems are the foundation of new knowledge based products and services, in knowledge economies and help firms manage their knowledge assets.

Information systems make it possible for business to adopt flatter, more employees and management. Organizations are trying to become more competitive and efficient by transforming themselves into digital firms where nearly all core business processes and relationships with customers, suppliers, and employees are digitally enabled.

Outputs of a Management Information System

- Scheduled report: produced periodically, or on a schedule;
- Key-indicator report: summary of the previous day's critical activities;
- Demand report: developed to give certain information at someone's request;

- Exception report: automatically produced when a situation is unusual or requires
- Management action;
- Drill-down reports: provides increasingly detailed data about a situation.

Decision support system (dss)

Decision Support System (DSS) is a computer-based information system that supports business or organizational decision-making activities. DSS serve the management, operations, and planning levels of an organization and help to make decisions, which may be rapidly changing and not easily specified in advance. DSSs include knowledge-based systems. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from a combination of raw data, documents, personal knowledge, or business models to identify and solve problems and make decisions. There are many definitions for DSS:

- Decision Support System (DSS) are described as Interactive Computer Based Systems, which help decision makers utilize data and modules to solve unstructured problems.
- Keen and Scott Morton stated that Decision Support Systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions. It is a computer based system for management decision maker who deal with semi structured problems.
- Earliest definition by Gerritz is one who described DSS as an effective blend of human intelligence, information technology, and software that interact closely to solve complex problems.
- DSS is a coordinated collection of data systems, tools, and techniques with the necessary software and hardware through which an organization gathers and interprets relevant information from the business and environment and turns into information that can be acted upon.

Decision Support System (DSS) - Provide interactive and ad-hoc information support to managers and business professionals during the decision-making process. Example, in what-if analyzes, it helps to determine where to spend advertising funds.

The Distinct Elements of DSS:

- DSS Tools are programs or codes which are the foundations used to create the DSS generators and in turn specific DSS.

- Example Electronic Spread Sheets, 4GLS, RDBMS etc.
- DSS Generators the combination of DSS tools in the computer.
- Specific DSS

Database - The intelligence function develops and coordinates the flow of information from the multitude of external and internal resources. The primary task is to capture the data that can be used with the other components of the DSS to make decisions. A critical objective is to centralize all data in proper form and in sufficient detail so that it is accessible for decision making.

Decision Models - A model may be nothing more sophisticated than a rule of thumb, for example for each percent decline in territorial market share; trade promotion advertising should be increased by 5 percent. Models can be complicated computer drivenmathematical equations. These quantitative and qualitative conceptualize how a system operates. The model ex presses perception as to what data and variables are important and how the variables are related.

Statistics and Manipulation - These aspects of the DSS produce meaningful information by relating the data into the models. The typical operations involve segregating numbers into groups, aggregating them, taking ratios, ranking them, plotting them, making tables and so forth. General managerial models preform a profit and loss statements, budgetstatements, forecasting statements etc. and more Complex models marketing mix planning,, product portfolio analysis, new product tracking are aspects of data analysis in this process.

Display - this is the interface between the business manager and the DSS.

DSS Task Environment

Tasks of DSS has four dimensions

- Degree of Structure designed to address unstructured or semi structured problems.
- Level of Application applied at all three levels of management, that is,
  - Operational control
  - Managerial control
- Strategic planning
- Phase of Decision Process involves three primary phases, namely,
  - Intelligence gathering
  - Alternative development
  - Choice
- Recurrence both for regular task and once in a while tasks.

Executive support system (ESS)

Executive Support System (ESS) - Supports the information needs of very senior executives by summarizing and presenting data at the highest level of aggregation.

Usually ESSs involve presenting reports in standard formats, and they often involve graphic characteristics of an ESS.

The primary goal of an ESS is to obtain data from a variety of sources, integrate and aggregate that data, and display the resulting information in an easy to use comprehensive format. The characteristics of an ESS are:

- Graphical
- Easy-to-use interface
- Broad, aggregate perspective
- Able to expand detail
- Provides context
- Integrates many sources of data
- Timeliness crucial

Pointing devices and touch screens are often used. The goal is to require as little knowledge and skill on the part of the executives as possible.

ESS provides broad, highly aggregated information. At the same time, they can show further detail when, for example, an executive sees something that seems curious and wants to know the underlying data.

Executives are looking for differences that make a difference. Therefore, they want to see information within a context. Because executives have broad span of interest, an effective ESS must integrate many sources of data. And since executives typically need to respond rapidly to changing circumstances, timeliness is crucial. Information that is even a week old is often not useful.

As shown below ESS accepts data from all the other types of information systems. It also accepts input from personnel who support the executive, such as administrative assistants.

Other information systems

Database Systems

The purpose of a database is to keep track of things. Databases can exist on paper, for example a telephone directory, but are inefficient and costly to maintain. A computer-based database offers the advantage of powerful search facilities which can be used to locate and retrieve information many times faster than by manual

methods. An electronic database provides facilities for users to add, amend or delete records as required. Indexing features mean that the same basic information can be stored under a number of different categories. This provides great flexibility and allows users to locate, retrieve and organize information as needed. Databases used throughout a company are usually accessed by many different users across a network system. Some of the advantages of this approach include minimizing the unnecessary duplication of information, consistency is maintained by ensuring any changes made to the information held in the database are reflected to all users and although information is held in a structured manner, the database software will normally provide sufficient flexibility to meet the different requirements of individual users and departments.

Expert System

Expert System: are a specialized type of information system which provides advice and assistance on semi-structured problems. An expert system uses reasoning to render advice, make recommendations, or diagnose problems. To do this, the expert system processes input data against a knowledge base. In most expert system today, the knowledge base consists of a set of rules. For example, one organization uses an expert system to make recommendations to employees about the cost – effective means of shipping parcels. The user inputs size, weight, destination, and time constraints into the expert system. The system processes this data against a knowledge base of rules that tells which companies handle specific sizes of shipments, under what time constraints and at what costs. Thus, the system can make a recommendation about the most cost-effective transportation means. An expert system encodes knowledge that can take a human several months, years, or even decades to learn. The shipping advisor system, for instance, contains knowledge that shipping clerks normally require several months to learn. Using this expert system, new employees can be productive far more quickly. Also, when experienced and seasoned employees are promoted or otherwise leave the department, the benefit of their knowledge is retained, since it has been incorporated into the rule base. The term expert system may be misleading. Most systems today do not possess the capability of a true human expert. It might be better to think of these systems as knowledge helpers and encodes than as true experts.

Knowledge Management Systems

Knowledge Management Systems - supports the creation, organization and dissemination of business knowledge across the company.

Example: access to best business practices through the intranet

Strategic Systems

Strategic Systems - help find strategic advantages for consumers
Examples: shipment tracking, Web systems, e-commerce

E-commerce

A common activity associated with e-business is e-commerce which can be described as using technology to conduct business transactions, such as buying and selling goods and services. However, e-commerce involves more than merely conducting electronic transactions; it also encompasses a wide range of associated activities, such as after-sales support and even logistics. E-commerce activities can be broken down into five basic types:

- Business-to-business (B2B). Transactions take place between companies. Approximately 80 per cent of all e-commerce is of this type.
- Business-to-consumer (B2C). Companies sell products directly to consumers. B2C can involve activities such as product research (where consumers gather information and compare prices) and electronic delivery (where information products are delivered to consumers via e-mail or other means).
- Business-to-government (B2G). Transactions take place between companies and public sector organizations.
- Consumer-to-consumer (C2C). Transactions take place between private individuals. Perhaps the best examples of C2C commerce are online auction sites and peer-to-peer systems.
- Mobile commerce (m-commerce). M-Commerce is a relatively new development and involves selling goods or services via wireless technology, especially mobile phones.

Business Functional Systems

Business Functional Systems - focuses on the operational and managerial applications of the core business functions. There are several types of information systems that support certain business functions, such as: Accounting, Finance, Marketing, Operations Management and Human Resource Management.

Accounting Information Systems

Accounting Information Systems - are the oldest and most used business information systems. These systems record and report business transactions and economic events, produce financial statements, forecast future conditions.

Typically they focus on order processing, inventory control, accounts receivable, accounts payable, payments and ledger systems.

Financial Information Systems

Financial Information Systems - Information regarding flow of finance in an organization. All organization has some kind of financial information system; this category of information is the flow of finance/money throughout the organization, and if they are designed correctly, the profitability and responsibility accounting systems follow the organizational structure. These systems involve large amount of data concerned primarily with historical and internal, although in some areas of financial planning, the system provides the futuristic look associated with planning. Budgeting is wholly futuristic. Some of the subsystem are:

- Financial Planning
- Cost Accounting
- General Ledger
- Asset Accounting
- Budgets
- Accounts Receivable/payable
- Payroll

Periodically, management approves some type of financial plan (the master budget) that assigns responsibility for maintaining incomes, investments, and costs within standard limits. This plan then becomes the basis for periodic reports on performance against plan, and these reports become the device by which control is exercised. Major problems in such a system involve:

- Determining equitable standards of control;
- Determining when action is required; and
- Obtaining rapid, up-to-date information on variances.

It is unlikely that the automation of financial records will decrease the problems associated with the first two attributes. It will, however, materially assist in speeding up reporting.

The financial system is probably the most important single management information system in the company, and in most companies it is the oldest and best developed. The major concern associated with this system is a vital tool for operating and planning. Moreover, the financial system has a very significant impact on other information systems when one considers that the ultimate common denominator of many operating decisions is the money.

Example – Billing

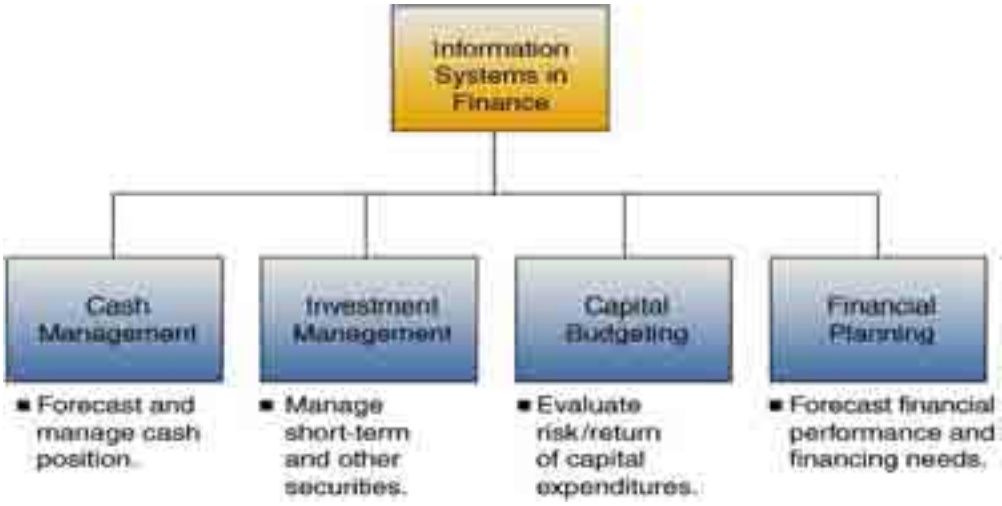
Billing is perhaps the most widely used data processing application.

Despite the fact that the preparation of invoices is often viewed as a somewhat casual clerical function, the speed and accuracy of the operation can have a significant impact upon cash flow as well as customer goodwill. Additional advantages include clerical savings, timelier Processing, the release of high-speed employees for other functions, and the flexibility to absorb additional work load during times of increased growth. Objectives:

- Provide Input to other Subsystems
- Improve cash flow
- Maintain customer goodwill
- Timely invoice processing
- Keep salesmen informed

Other systems which receive information from it are:

- Accounts receivable
- Sales analysis
- Tax reports
- Commission statement
- Shipping documents
- Inventory



Example of Financial Management System

Marketing Information System

The basic areas of the marketing function that lend themselves to improvement through information systems include:

- Forecasting/sales planning
- Market research
- Advertising

Operating and control information required to manage the marketing function, i.e., sales report, distribution cost reports etc.

A well-developed marketing information system will help manager make better decisions about:

- Pricing
- Advertising
- Product promotion policy
- Sales force effort, etc.

It requires both internal information, like sales report and external information like feedback from the market place. In fact the effectiveness of marketing information system depends to a large extent on feedback from the market place to the firm, so that the firm can judge the adequacy of its past performance as well as appraise the opportunities for new activities. ***Example - Interactive Marketing***, is a client-focused marketing process, utilizing Internet, intranet and extranet networks. Creates two-way communication lines between a business and its customers or potential customers.

Purpose: to make good use of networks to attract and retain customers, to use customer feedback as a guide in improving and creating products and services.

Logistics Information System

Logistics Information System (Production/ Operation Information System) - Concerned with the information about physical flow of goods/services. It covers such activities as:

- Production planning and control
- Inventory control and management
- Purchasing
- Distribution
- Transportation

The logistics information system gives information about:

- Development of product/services
- Cost savings
- Management improvement

An examination of this area leads to the design of related and integrates subsystems throughout the company. Examples:

a. Purchasing:
Objectives:

- Determining Economic Order Quantity (EOQ) to buy. Reduce clerical costs.
- Monitor buyer performance.
- Identify high volume vendors to negotiate higher discounts.
- Determine supplier performance by identifying late deliveries and poor quality.

b. Materials Planning:
Objectives:

- Plan and control parts from a predetermined production schedule.
- Reduce the time and costs of determining and ordering material requirements. Allow no disruptive changes to production schedule.
- Forecast changes in material requirements resulting from production schedule change.

c. Capacity Planning and Operations Scheduling:
Objectives:

- Evaluate alternatives of subcontracting or overtime to meet delivery dates.
- Identify orders to be rescheduled to level the load.
- Forecast time and location of equipment and tooling needs.
- Compute start dates for shop orders to meet delivery dates.
- Forecast skills and trades required.
- Forecast order release dates.

Human Resource Information Systems (HRIS)

HR Technology shape an intersection between human resource management (HRM) and information technology. It merges HRM as a discipline and in

particular its basic HR activities and processes with the information technology field. The function of Human Resources departments is generally administrative and common to all organizations. Organizations may have formalized selection, evaluation, and payroll processes.

The HR function consists of tracking existing employee data which traditionally includes personal histories, skills, capabilities, accomplishments and salary. To reduce the manual workload of these administrative activities, organizations began to electronically automate many of these processes by introducing specialized Human Resource Management Systems. Due HR executives rely on internal or external IT professionals to develop and maintain an integrated HRMS.

The Human Resource Management System generally encompasses:

- Payroll
- Work Time
- Benefit administration
- HR Management Information System
- Recruiting
- Training / Learning Management System

The Payroll module automates the pay process by gathering data on employee time and attendance, calculating various deductions and taxes, and generating periodic pay cheques and employee tax reports. Data is generally fed from human resources and time keeping modules to calculate automatic deposit and manual check writing capabilities. This module can encompass all employee-related transactions as well as integrate with existing financial management systems.

The Work Time gathers standardized time and work related efforts. The most advanced modules provide broad flexibility in data collection methods, lab distribution capabilities and data analysis features. Cost analysis and efficiency metrics are the primary functions.

The Benefits Administration module provides a system for organizations to administer and track employee participation in benefits programs. These are typically encompass insurance, compensation, profit sharing and retirement.

The HR management module is a component covering many other HR aspects from application to retirement. The system records basic demographic and address data, selection, training and development, management capabilities and skills, compensation planning records and other related activities.

Leading edge systems provide the ability to "read" applications and enter relevant data into applicable database fields, notify employers and provide position management and position control.

Human resource management function involves the recruitment, placement, evaluation, compensation and development of employees of an organization. Initially, businesses use computer based information system to:

- Produce pay checks and payroll reports;
- Maintain personnel records;
- Pursue Talent Management.

Online Recruiting has become one of the primary methods employed by HR departments to garner potential candidates for available positions within an organization. Talent Management systems typically encompass:

- Analyzing personnel use within an organization;
- Identifying potential applicants;
- Recruiting through company-facing listings;
- Recruiting through online recruitment sites or publications that market to both recruiters and applicants.

Significant cost incurred in maintaining an organized recruitment effort, cross-posting within and across general or industry-specific job boards and maintaining a competitive exposure of benefits has given rise to the development of a dedicated Applicant Tracking System, or 'ATS' module. The 'Training Module' provides a system for organizations to administer and track employee training and development efforts. The system, normally called a Learning Management System if a standalone product, allows HR to track the education, qualifications and skills of its employees as well as developing what training courses, books, CD, web based learning or materials are available to develop which skills . Courses can then be offered on specific dates, with delegates and training resources being mapped and managed within the same system. Sophisticated LMS allow managers to tailor training, budgets and calendars along with performance management and appraisal metrics. Many organizations have gone beyond traditional functions and developed human resource management information systems that support recruitment, selection, hiring, job placement, performance appraisals, employee benefit analysis, health, safety and security, while others integrate an outsourced Applicant Tracking System that encompasses a subset of the above.

Office automation system (oas)

These systems create, store, modify, and process inter personal communications, whether in written, verbal, and video form.

The prevalence of microcomputers in offices, along with a veritable explosion in new communications, computers, and storage devices has caused fundamental changes in the ways that business people communicate. At first, computer systems were used as word processors. Over time, interconnected computers let users share *word processing files* and messages electronically. Today a wide variety of OAS exists.

With *electronic mail systems,* business people create and send messages to one another.

On *electronic bulletin boards*, files are essentially electronic posts on which people can leave public messages. Today these systems have become more useful because high quality graphics can be included in the messages.

Facsimile (Fax) machines have been improved and reduced in cost, so documents containing text, illustrations, and graphics can be communicated over telephone lines. Personal computers can both send and receive faxes, if they are properly equipped.

In parallel with these developments, computer technology has improved voice message systems. Business telephones are connected to sophisticated private branch exchange (PBX) systems - computer based *switch boards* that not only support voice mail but also flexible call forwarding, telephone conferencing, and the like.

In addition, companies in document intensive industries such as insurance have developed image processing systems in which documents are *scanned* to produce an *electronic image* of every document it receives. Each image is coded with date, time, critical numbers (such as customer number, invoice number and the like), and comments.

When a customer calls regarding insurance claim, the agent is able to electronically access all data and correspond about that claim.

Collaborative writing systems enable groups of people to work together, in parallel, in the development such as proposals. Participants use the system both to contribute their work and to review the work of others as it is developed.

Finally, large organization use *video conferencing* to let people communicate face to face without traveling. At first, such capabilities were used to connect key executives in two or three locations. Recently such systems have been used to connect thousands of people to see and hear the presentation.

Most of these systems have been developed in isolation from each other.

Multimedia systems, appearing today, create message that are composite of the separate capabilities text, drawings, images, data, voice, and motion video. In some systems, messages are not limited to elements physically stored at any one site. Instead, they are created on demand from data assembled from many sites.

OASs and New Human Capabilities

Doug Englebert one of the pioneers in OASs, predict that the real power of such systems will not be realized by improving our productivity in working as we do today. Rather, the *greatest benefit will be to let people think, communicate, and work together in new ways.* OASs can change the way people view, conceptualize and solve problems.

Types of OAS Resources

- Word Power - Creates documents electronically
- Electronic Mail - Sends and receives messages electronically
- Electronic Bulletin Board - Posts electronic notices
- Facsimile (Fax) - Sends documents over telephone lines
- Voice Mail - Supports voice mail boxes, provides sophisticated telephone facilities
- Image Processing - Enables online access to pictures and documents
- Collaborative Document Processing - Enables groups to share the drafting of documents
- Video Conferencing - Communicates face to face without traveling
- Multimedia - creates composite documents and messages

For example, in hypertext systems, text, illustration, graphics, data, programs, audio, and video can be integrated into electronic documents. Users can read such a document sequentially or at random just as books can be read.

In OAS the media involved are so disparate (computers, telephones, television screens, coy machines, graphics plotters, audio equipment etc.) that no single chart can show any one over all architecture. In addition, specific applications are selected to meet the needs of particular companies and workgroups, and they may change over time. The needs of an architectural firm, the technical writing group of a software house, and the operations management group for a shipyard are significantly different, and OAS application must be selected to meet each set of needs.

Reasons to Study Information Systems

Instead of conclusion, we present some facts about information systems, which give us a basic justification for the importance of their study.

As stated above:

The Information System is a large functional business area, an important

contributor to operational efficiency, employee productivity and customer service. It is a great source of information and decision support, vital player in developing competitive products and services in the global market, dynamic opportunity and career challenging, key component of today's integrated business network!

Most businesses today have limited, defined objectives, and they deliver measurable value within strongly imposed structures and rules, but because of their close coupling to unstable markets, they are subject to radical change. They contend with unnatural time scales, unexpected innovations from competitors, shifting markets, and severe mismatches of internal and external pace.

Better, timely, accurate and *just the right* knowledge is what it takes to make strategic decisions that keep such businesses ahead of their competition.

Consequently, the most efficient use of the opportunities offered by the development of information technology today, we can give consistency and greater security of the local business participation in the global competitive market!

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