Management Information System

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Objectives and Characteristics of Management Information System

A management information system (MIS) is a system or process which provides information needed to manage organizations effectively. Management information systems are regarded to be a subset of the overall internal controls procedures in a business, which cover the application of people, documents, technologies, and procedures by management accountants to solve business problems such as costing a product, service or a business-wide strategy. Management information systems are distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization. Academically, the term is commonly used to refer to the group of information management methods tied to the automation or support of human decision making, e.g. Decision Support Systems, Expert systems, and Executive information systems.

At the start, in businesses and other organizations, internal reporting was made manually and only periodically, as a by-product of the accounting system and with some additional statistics, and gave limited and delayed information on management performance. Previously, data had to be separated individually by the people as per the requirement and necessity of the organization. Later, data was distinguished from information, and instead of the collection of mass of data, important, and to the point data that is needed by the organization was stored.

Early on, business computers were mostly used for relatively simple operations such as tracking sales or payroll data, often without much detail. Over time these applications became more complex and began to store increasing amounts of information while also interlinking with previously separate information systems. As more and more data was stored and linked man began to analyze this information into further detail, creating entire management reports from the raw, stored data. The term "MIS" arose to describe these kinds of applications, which were developed to provide managers with information about sales, inventories, and other data that would help in managing the enterprise. Today, the term is used broadly in a number of contexts and includes (but is not limited to): decision support systems, resource and people management applications, ERP, SCM, CRM, project management and database retrieval application.

An 'MIS' is a planned system of the collecting, processing, storing and disseminating data in the form of information needed to carry out the functions of management. In a way it is a documented report of the activities that were planned and executed.

According to Philip Kotler "A marketing information system consists of people, equipment, and procedures to gather, sort, analyze, evaluate, and distribute needed, timely, and accurate information to marketing decision makers."

The terms MIS and information system are often confused. Information systems include systems that are not intended for decision making. The area of study called MIS is sometimes referred to, in a restrictive sense, as information technology management. That area of study should not be confused with computer science. IT service management is a practitioner-focused discipline. MIS has also some differences with Enterprise Resource

Planning (ERP) as ERP incorporates elements that are not necessarily focused on decision support.

Professor Allen S. Lee states that "...research in the information systems field examines more than the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact".

Objectives of MIS:

Managers play a key role in any organization. They are responsible for taking decisions appropriate to the need of the market. Information systems have become the main tool used by managers in decision making. Managers perceive information as the driving force to achieve success in any business. Hence there is a need for MIS as:

- Support of its business process and operations
- Support of decision making by its employees and managers
- Support of its strategies for competitive advantage-Gaining a strategic advantage

The major roles of the business applications of a Management Information System may be represented in the pyramid form as below:

- Support Strategies for Competitive Advantage
- Support Business Decision Making
- Support Business Process and Operations

Characteristics of MIS:

- MIS is mainly designed to take care of the needs of the managers in the organization.
- MIS aids in integrating the information generated by various departments of the organization.
- MIS helps in identifying a proper mechanism of storage of data.
- MIS also helps in establishing mechanism to eliminate redundancies in data.
- MIS as a system can be broken down into sub systems.

The role and significance of MIS in business and its classification is explained. It is possible to understand the various phases of development in MIS based on the type of system required in any organization.

Strategic Information System

A Strategic Information System (SIS) is a system to manage information and assist in strategic decision making. A strategic information system has been defined as, "The information system to support or change enterprise's strategy." A SIS is a type of Information System that is aligned with business strategy and structure. The alignment increases the capability to respond faster to environmental changes and thus creates a competitive advantage. An early example was the favorable position afforded American and United Airlines by their reservation systems, Sabre and Apollo. For many years these two systems ensured that the two carriers' flights appeared on the first screens observed by travel agents, thus increasing their bookings relative to competitors. A major source of controversy surrounding SIS is their sustainability. SISs are different from other comparable systems as:

1) They change the way the firm competes.
2) They have an external (outward looking) focus.
3) They are associated with higher project risk.
4) They are innovative (and not easily copied).

It is mainly concerned with providing and organization and its members an assistance to perform the routine tasks efficiently and effectively. One of the major issue before any organization is the challenge of meeting its goals and objectives. Strategic IS enable such organization in realizing their goals. Strategic Information System (SIS) is a support to the existing system and helps in achieving a competitive advantage over the organizations competitors in terms of its objectives. This unit deals with the critical aspects of the strategic information system. This units indicates the theoretical concepts and the way in which the same are realized in practice. The flow of the unit is in such a way that it starts with the development of contemporary theory about strategic uses of corporations' internal information systems leading to systems which transcend the boundaries of particular organizations. The process whereby strategic information systems are created or identified is then examined. A number of weaknesses in the existing body of theory are identified, and suggestions made as to directions in which knowledge is or may be progressing. A strategic information system is concerned with systems which contribute significantly to the achievement of an organization's overall objectives. The body of knowledge is of recent origin and highly dynamic, and the area has an aura of excitement about it. The emergence of the key ideas, the process whereby strategic information systems come into being is assessed, areas of weakness are identified, and directions of current and future development suggested.

Information system is regarded as a tool to provide various services to different management functions. The tools have been developing year by year and the application of the tool has become more and more diverse. In management it is now a very powerful means to manage and control various activities and decision making process. The original idea of automating mechanical processes got quickly succeeded by the rationalization and integration of systems. In both of these forms, IS was regarded primarily as an operational support tool, and secondarily as a service to management. Subsequent to the development, it was during the last few years that an additional potential was discovered. It was found that, in some cases, information technology (IT) had been critical to the implementation of an organization's strategy.

An organization's strategy supported by information system fulfilling its business objectives came to be known as Strategic Information System. The strategic information system consists of functions that involved gathering, maintenance and analysis of data concerning internal resources, and intelligence about competitors, suppliers, customers, government and other relevant organizations.

Planning and Development of Management Information Systems.

Planning of information systems

Many organizations have purchased computers for data processing and for meeting the statutory requirements of filling the returns and reports to the government. Computers are used mainly for computing and accounting the business transactions and have not been considered as tool for information processing.

The organizations have invested on computers and expanded its use by adding more or bigger computers to take care of the numerous transactions in the business. In this approach, the information processing function of the computers in the organization never got its due regard as an important asset to the organization. In fact, this function is misinterpreted as data processing for expeditious generation of reports and returns, and not as information processing for management action and decisions.

However, the scene has been changing since late eighties when the computers become more versatile, in the function of storage, communication, intelligence and language. The computer technology is so advanced that the barriers of storage, distance understanding of language and speed are broken.

In short, we need a management information system flexible enough to deal with the changing information needs of the organization. It should be conceived as an open system continuously interacting with the business environment with a built-in mechanism to provide the desired information as per the new requirements of the management. The designing as such in open system is a complex task. It can be achieved only if the MIS is planned, keeping in view, the plan of the business management of the organization.

Development of information systems

Once the plan of MIS is made, the development of the MIS calls for determining for the strategy of development. As discussed earlier, the plan consists of various systems and sub systems. The development strategy determines where to begin and what sequence the development can take place with the sole objective of assuring the information support.

The choice of the system or the sub-system depends on its position in the total MIS plan, the size of the system, the user understands of the systems and the complexity and its interface with other systems. The designer first develops systems independently and starts integrating them with other systems, enlarging the system scope and meeting the varying information needs.

Determining the position of the position of the system in the MIS is easy. The real problem is the degree of structure, and formalization in the system and procedures which determine the timing and duration of development of the system.

Necessity and importance of Systems Design in MIS

The business application system demands designing of systems suitable to the application in project.

The major steps involved in the design are the following:

Input Design - Input design is defined as the input requirement specification as per a format required. Input design begins long before the data arrives at the device. The analyst will have to design source documents, input screens and methods and procedures for getting the data into the computer.

Output Design - The design of the output is based on the requirement of the user – manager, customer etc. The output formats have to very friendly to the user. Therefore the designer has to ensure the appropriateness of the output format.

Development - When the design and its methodology is approved, the system is developed using appropriate business models. The development has to be in accordance to a given standard. The norms have to be strictly adhered to.

Testing - Exhaustive and thorough testing must be conducted to ascertain whether the system produces the right results. Testing is time consuming: Test data must be carefully prepared, results reviewed and corrections made in the system. In some instances, parts of the system may have to be redesigned. Testing an information system can be broken down into three types of activities: unit testing, system testing and acceptance testing. Unit testing or program testing consists of testing each program separately in the system. The purpose of such testing is to guarantee that programs are error free, but this goal is realistically impossible. Instead, testing should be viewed as a means of locating errors in programs, focusing on finding all ways to make a program fail. Once pinpointed, problems can be corrected. System testing tests the functioning of the information system as a whole. It tries to determine if discrete modules will function together as planned and whether discrepancies exist between the way the system actually works and the way it was conceived. Among the areas examined are performance time, capacity for file storage and handling peak loads, recovery and restart capabilities and manual procedures. Acceptance testing provides the final certification that the system is ready to be used in a production setting. Systems tests are evaluated by users and reviewed by management. When all parties are satisfied that the new system meets their standards, the system is formally accepted for installation.

Implementation and Maintenance

Conversion – Conversion is the process of changing from the old system to the new system. Four main conversion strategies can be employed. They are the parallel strategy, the direct cutover strategy, the pilot strategy and the phased strategy.

In a parallel strategy both the old system and its potential replacement are run together for a time until everyone is assure that the new one functions correctly. This is the safest conversion approach because, in the event of errors or processing disruptions, the old system can still be used as a backup. But, this approach is very expensive, and additional staff or resources may be required to run the extra system.

The direct cutover strategy replaces the old system entirely with the new system on an appointed day. At first glance, this strategy seems less costly than the parallel conversion strategy. But, it is a very risky approach that can potentially be more costly than parallel activities if serious problems with the new system are found. There is no other system to fall back on. Dislocations, disruptions and the cost of corrections are enormous.

The pilot study strategy introduces the new system to only a limited area of the organization, such as a single department or operating unit. When this version is complete and working smoothly, it is installed throughout the rest of the organization, either simultaneously or in stages.

The phased approach strategy introduces the new system in stages, either by functions or by organizational units. If, for example, the system is introduced by functions, a new payroll system might begin with hourly workers who are paid weekly, followed six months later by adding salaried employees(who are paid monthly) to the system. If the system is introduced by organizational units, corporate headquarters might be converted first, followed by outlying operating units four months later.

Moving from an old system to a new system requires that end users be trained to use the new system. Detailed documentation showing how the system works from both a technical and enduser standpoint is finalized during conversion time for use in training and everyday operations. Lack of proper training and documentation contributes to system failure, so this portion of the systems development process is very important.

Production and maintenance

After the new system is installed and conversion is complete, the system is said to be in production. During this stage the system will be reviewed by both users and technical specialists to determine how well it has met its original objectives and to decide whether any revisions or modifications are in order. In some instances, a formal post implementation audit document will be prepared. After the system has been finetuned, it will need to be maintained while it is in production to correct errors, meet requirements or improve processing efficiency.

Once a system is fully implemented and is being used in business operations, the maintenance function begins. Systems maintenance is the monitoring, or necessary improvements. For example, the implementation of a new system usually results in the phenomenon known as the learning curve. Personnel who operate and use the system will make mistake simply because they are familiar with it. Though such errors usually diminish as experience is gained with a new system, they do point out areas where a system may be improved.

Maintenance is also necessary for other failures and problems that arise during the operation of a system. End users and information systems personnel then perform a troubleshooting function to determine the causes of and solutions to such problems.

Maintenance also includes making modifications to an established system due to changes in the business organizations, and new e-business and ecommerce initiatives may require major changes to current business systems.

Managing an E-business & Challenges before an E-business

Due to Internet capabilities and web technology, traditional business organization definition has undergone a change where scope of the enterprise now includes other company locations, business partners, customers and vendors. It has no geographic boundaries as it can extend its operations where Internet works. All this is possible due to Internet and web moving traditional paper driven organization to information driven Internet enabled E-business enterprise. E-business enterprise is open twenty-four hours, and being independent, managers, vendors, customers transact business any time from anywhere. Internet capabilities have given E-business enterprise a cutting edge capability advantage to increase the business value. It has opened new channels of business as buying and selling can be done on Internet. It enables to reach new markets across the world anywhere due to communication capabilities. It has empowered customers and vendors / suppliers through secured access to information to act, wherever necessary. The cost of business operations has come down significantly due to the elimination of paper-driven processes, faster communication and effective collaborative working. The effect of these radical changes is the reduction in administrative and management overheads, reduction in inventory, faster delivery of goods and services to the customers.

In E-business enterprise traditional people organization based on **'Command Control'** principle is absent. It is replaced by people organization that is empowered by information and knowledge to perform their role. They are supported by information systems, application packages, and decision-support systems. It is no longer functional, product, and project or matrix organization of people but E-organization where people work in network environment as a team or work group in virtual mode. E-business enterprise is more process-driven, Technology-enabled and uses its own information and knowledge to perform. It is lean in number, flat in structure, broad in scope and a learning organization. In E-business enterprise, most of the things are electronic, use digital technologies and work on databases, knowledge bases, directories and document repositories. The business processes are conducted through enterprise software like ERP, SCM, and CRM supported by data warehouse, decision support, and knowledge management systems. Today most of the business organizations are using Internet technology, network, and wireless technology for improving the business performance measured in terms of cost, efficiency, competitiveness and profitability. They are using E-business, Ecommerce solutions to reach faraway locations to deliver product and services. The enterprise solutions like ERP, SCM, and CRM run on Internet (Internet / Extranet) & **Wide Area Network** (WAN). The business processes across the organization and outside run on Etechnology platform using digital technology. Hence today's business firm is also called E-enterprise or Digital firm.

The paradigm shift to E-enterprise has brought four transformations, namely:

1. Domestic business to global business.
2. Industrial manufacturing economy to knowledge-based service economy.
3. Enterprise Resource Management to Enterprise Network Management.
4. Manual document driven business process to paperless, automated, electronically transacted business process.

These transformations have made conventional organization design obsolete. In E-enterprise, business is conducted electronically. Buyers and sellers through Internet drive the market and Internet-based web systems. Buying and selling is possible on Internet. Books, CDs, computer, white goods and many such goods are bought and sold on Internet. The new channel of business is well-known as Ecommerce. On the same lines, banking, insurance, healthcare are being managed through Internet E-banking, E-billing, E-audit, & use of Credit cards, Smart card, ATM, E-money are the examples of the Ecommerce application. The digital firm, which uses Internet and web technology and uses E-business and Ecommerce solutions, is a reality and is going to increase in number.

MIS for E-business

MIS for E-business is different compared to conventional MIS design of an organization.

The role of MIS in E-business organization is to deal with changes in global market and enterprises. MIS produces more knowledge-based products. Knowledge management system is formally recognized as a part of MIS. It is effectively used for strategic planning for survival and growth, increase in profit and productivity and so on. To achieve the said benefits of E-business organization, it is necessary to redesign the organization to realize the benefits of digital firm. The organization structure should be lean and flat. Get rid of rigid established infrastructure such as branch office or zonal office. Allow people to work from anywhere. Automate processes after reengineering the process to cut down process cycle time. Make use of groupware technology on Internet platform for faster response

processing. Another challenge is to convert domestic process design to work for international process, where integration of multinational information systems using different communication standards, country-specific accounting practices, and laws of security are to be adhered strictly.

Internet and networking technology has thrown another challenge to enlarge the scope of organization where customers and vendors become part of the organization. This technology offers a solution to communicate, coordinate, and collaborate with customers, vendors and business partners. This is just not a technical change in business operations but a cultural change in the mindset of managers and workers to look beyond the conventional organization. It means changing the organization behaviour to take competitive advantage of the E-business technology.

The last but not the least important is the challenge to organize and implement information architecture and information technology platforms, considering multiple locations and multiple information needs arising due to global operations of the business into a comprehensive MIS.

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