THE CONCEPT OF
SYSTEM APPROACH

"It isn't that they can't see the solution
It is that they can't see the problem"
- G.K. Chesterton

Introduction

The basic philosophy or point of view, which is implemented in a systems approach, is not new. The term systems approach came into prominence in World War II. The idea of a scientific approach to decision-making, however, is rooted in antiquity. Churchman\(^1\) (1968) pointed out that Plato subscribed to this concept when he designed the model of a city-state in his Republic. Today, scientific, systematic approach to problem-solving, decision-making, and planning is widely used in the social service and education professions.

The systems approach refers to a scientific method of problem-solving, decision-making, and planning. Churchman\(^2\) (1968) defined systems approach as a procedure for characterizing the nature of a system, so that decision-making might be made in a logical and coherent fashion, and the performance of a system might be described. Silvern\(^3\) (1972) equated the systems approach with anasynthesis, that is, an iterative operation of analysis and synthesis.
The idea of applying elaborate techniques and utilizing computer technology to find means for realizing specified objectives was stressed by Von Bertalanffy\textsuperscript{4} (1968) who elaborated on the concept to say that the systems approach involves a consideration of alternative solutions and of choosing those promising optimizations at maximum efficiency and minimal cost in a complex network of interactions.

Banathy\textsuperscript{5} (1968) viewed the systems approach as the applications of systems thinking to human endeavours with the intent of analyzing effectiveness and the economy of existing systems, solving complex problems, and designing synthetic entities.

The systems approach is concerned with identifying goals and determining and evaluating the means for accomplishing these goals. Identifying and organizing the goals and objectives requires a clear specification of the objectives of each element in the total system in relation to the terminal goals or mission of the system as a whole. It also requires prioritizing the goals and the objectives which implement each goal.

Planning courses of action to accomplish the desired ends involves:

(i) Determining programmes to achieve the desired ends;

(ii) Identifying operational constraints in the system;
(iii) Organizing and maximizing the utilization of resources;

(iv) Determining alternatives and simulating to test these alternatives; and

(v) Determining the optimal mix of means within the limits of the system.

The system approach involves monitoring progress once the system is initiated and is being maintained, with feedback to direct adjustments in the operating system. Evaluation is an integral part of the systems approach. This requires checking the amount and quality of accomplishments; checking contributions of the elements in the process toward goal achievement; and using the results of the evaluation to make improvements and to design new systems.

Considering these conceptualizations of the systems approach, it may be seen that the definition generally takes on two parameters, that is, the purpose and the process. A systems approach is an operational concept which refers to a scientific and rational method of optimizing the outcomes of a system through the implementation of a set of sequentially related activities for studying existing systems, deriving solutions to problems, and developing new or modified entities. The purpose of the systems approach is to optimize outcomes by making the best possible utilization of existing and anticipated resources. The process involves the implementation of three major functions, each of which consists of a set of discrete
activities. This conceptualization of the systems approach concludes with an analysis of these three major functions and the implementing activities. A model of the process of systems approach is given in Figure 2.1

Model of the System Approach

![Diagram of the System Approach Process]

Figure 2.1
Information handling takes place in every organisation. But a systematic collection of the right data, its proper recording and timely retrieval for decision making are all parts of a well designed Management Information System, the need of which has become imperative in recent years. The major reason for most of the weaknesses in the existing information set up of many of the organisations is lack of a system approach. To provide each level of authority with appropriate information in the right form and at the right time, a system approach is inevitable. Such a system will help to collect, discriminate, select, relate, classify and interpret the information according to the needs of the user. The importance of information as an input is rightly quoted by P.N.Kaula in his article titled “Information Technology : Legal, Policy and Management issues.” In his words “The impact of microprocessor on society may be as great as that of the automobile or the electric light. The applications of the new technology are limited by lack of imagination, not by paucity of funds or technical capability. In fact, micro-electric devices are already becoming part of our daily lives, thanks to their declining prices and increasing capabilities. Word processors, Electronic games, Robots and Optical scanning cash registers are some of the products that have fast entered our offices, training institutions, factories and even homes.”

If information set up is based on the information needs of the user and is scientifically developed, so that all inter-related aspects of handling such as analysis, storage,
retrieval, flow and use are adequately covered, then it fulfils the requirements of a Management Information System. It is meant to meet the management's requirements for information with a systems approach focusing attention on the above mentioned aspects and impelling the executives to look for reliable information which could enable them to take and improve the managerial decisions. In addition the system would convert the mass of data available in the organisation into meaningful and required information. Thus information has two roles to perform in an organisation; first, to tell the executives when to take action; and second, to provide factual basis for taking such action.

There is a general feeling that in universities, in the public undertakings and in the government departments the executives are handicapped because of the non-availability of required information which they need for decision making. The reason for this is that the data generated and stored in these undertakings is not exactly determined on the basis of correct information requirements at each user level. As a result it seems there is good amount of data which is unnecessary and at the same time there are likely to be the gaps which directly affect the work of the user level. There is also considerable work at the user level. There is also considerable time lag in obtaining the required information with the result that by the time it reaches the user, it is
no more than historical information. This hinders scientific
decision making by the user. Such being the situation, it
is felt that a study of the existing information set up of one
the prominent universities in Kerla undertaken by Ramchandran\textsuperscript{7} would highlight the need for a system approach in storage
and retrieval of information. The objective of the study to
examine the existing information set up in one of the prominent
universities in Kerla. This study intends to measure the
attitudes of the staff towards the efficiency and/or inefficiency
of the existing information set up in the university. A.P.Nigavekar\textsuperscript{8} has raised certain points in relations to application of MIS
in University. According to him “Can the university system,
which has been burdened by proliferation and expansion,
constrained by inadequate funds, and locked within the rigid
frame of acts and statutes, be transformed into efficient
organization? Can one think of converting it into management
information system so as to apply modern technologies like
computers and communication? The answer is “yes”. Indeed,
it would be dangerous to either avoid or delay such a change,
because the university system is turning into uncontrollable
demon which if not controlled and managed professionally,
would harm the future generation. It is hence essential to
adopt novel strategies for the management of the university
system like M.I.S.”

The rapid developments that have taken place in recent
years, in the field of information technology, have paved the
way for revolutionary changes in higher education, in terms
of both methodologies and concepts. The new technologies have basically provided access to a vast volume of information, helped in handling this information more competently and have consequently assisted in improving both quality and productivity. Evidently if the breakthroughs in information technology are to be fully taken advantage of then there have to be major changes in our policies regarding teaching, research and education administration. A corollary is that there has to be a revamping of the infrastructure and appropriate changes in procedures and methodologies.

The organisation of today is operating under an environment of change which poses challenging facets of the problem to the management. To meet the prevailing problems it becomes a whole time job of management to be aware of fluctuating information under such environment of growing mechanism and increasing the speed of industrialisation.

Within the organisation information system has become an essential tool of management which enables the executives to perform managerial and decision making activities. Most organisations have always had some sort of such information system as the Accounting System, Production Scheduling system etc. to handle and process the information needed in various aspects of their work.

Modern management is highly information oriented. The MIS supplies the managerial and administrative information
through the means of communication, so that the managers or administrators may achieve the organisational goals.

After having discussed the general view of the MIS one should know how to define the MIS. The term MIS is composed of three components viz. Management, Information and system. Let us take up these components separately.

Management

Management is the process of getting things done through and with people. It is an activity of coordinating, controlling and directing an organisation to achieve desired results. Koontz and O'Donnell put it thus: “Acting in their managerial capacity, presidents, departmental heads, foreman, supervisors, college deans, bishops and heads of government agencies all do the same thing” According to F.W.Taylor, “Management is the art of knowing what you want to do and then seeing that they do it in the best and cheapest way.” Henry Fayol as such, “To manage is to do forecast and to plan, to organise, to command, to coordinate and to control.” E.F.L. Brech defines management as “a social process entailing social responsibilities of effective planning and regulation of operations of an enterprise in fulfillment of a given purpose of task.” Hodge and Jhonson defines the term management as decision making process. In their words: “Management is the process of making decisions and issuing commands on behalf of an organisation membership groups, taking, into
consideration the complex of objectives, limitations and standards underlying the production and distribution of value required to satisfy membership's needs." Lastly Peter Drucker\textsuperscript{13} in his book, The Essence of Management, define "Management as a multi-purpose organ that manage a business and manages managers and manages workers and works". However, most of the definitions suggest (i) different levels of management, and (ii) a sequence of steps which a manager should take up. For a particular organisational task, a manager ordinarily will perform the managerial functions in sequence: creating planning, organising motivating, communicating and controlling the human behaviour in the organisation as shown in Figure 2.2.

**The Functions of Managers**

![Figure 2.2](image-url)
Generally the levels of management are categorised as top management, middle management and lower management. Jerome Kanter named and explained as shown in Figure 2.3

**Management levels and nature of information**

<table>
<thead>
<tr>
<th>Management Levels</th>
<th>Nature of information Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Management Level</td>
<td>Strategic information</td>
</tr>
<tr>
<td>Tactical Management Level</td>
<td>Operational information</td>
</tr>
<tr>
<td>Operational Management Level</td>
<td>Control information</td>
</tr>
</tbody>
</table>

**Figure 2.3**

(a) **Strategic Management Level**

It refers to strategic plans and policies, long term goals and objectives of the organisation. They respond to tactical and operational level and also provide a link between organisation and environment.

(b) **Tactical Management level**

It is concerned with the generation of short term plans, policies, procedures, programmes and objectives within Framework provided by the strategic management level.

(c) **Operational Management level**

The responsibilities of management at this level is to implement the policies so that goods and services may be supplied to the society.
Figure 2.2 and 2.3 reveal firstly that all these steps (creating, planning, organising, motivating, communicating and controlling) are often involved at any level even if they are immediately apparent; secondly, some of these steps are often repeated and it is sometimes appropriate to return from one step to another to raise the plan in the light of subsequent developments, and thirdly, the common factor in every management activity is that a decision must be taken. So management is an active process, composed of some basic functions to achieve the objective of an enterprise through the efforts of its personnel.

**Information**

However, the exact nature of information is not easy to describe. Perhaps the most explicit definition in the technical literature defines information as recorded experience that is used in decision making.

In an organisational setting, recorded experience can take many forms. It may, for example, consist of sets of values of well defined measures such as are found in the financial statements of an enterprise. On the other hand, it may be much more qualitative in nature and consists of a verbal description of event, possibly interpreted with numeric data. In most practical situations the recorded experience to an organisation consists of a mixture of purely quantitative data and descriptive material.
It is to be noted that recorded experience becomes information only when it can be applied in a decision process. The value of the information that can be extracted from an amount of data or raw material depends therefore upon the use to which it can be put.

To Carl Heyel\textsuperscript{15} “Information is the symbolic representation of the real world (money, manpower, materials, machines, markets etc.)” Since decision makers at all the three levels rely on information systems to supply them with intelligence that will influence the selection of particular means and ends. It is essential that the information supplied should be an accurate representation of the real world. In fact this underscores the need for a carefully designed and reliably operating information system, otherwise, a manager can be making decisions based on information that does not mirror the real world.

**System**

System concepts and techniques aid management in developing and maintaining an effective framework of systems and procedures to satisfy the specific needs of the organisation. To Carl Heyel,\textsuperscript{16} “a system is an orderly arrangement of interdependent activities and related procedures which implement and facilitates the performance of major activity of an organisation.”

The scope of the system function however, goes far beyond systematic clerical office operations and preparing
procedures to govern them. It concerns itself with the overall complex interrelationships of organisational structure, functional divisions of responsibility, and the optimum flow of management information.

**Management Information System**

According to Murdick and Ross, "The MIS is the means for connecting the managed operating systems by exchange of information." Management Information Systems are designed to take advantage of modern tools and techniques. But MIS neither refers to the traditionally data processing systems nor to be sophisticated computer system.

To Paul Siegel, "An MIS is not a sophisticated computer system, a communication network, a generalised data base management system, an accounting system. The MIS is a philosophy, an approach, a point of view, a way of seeing the organisation as a whole. It is at the core of a hierarchy of systems."

**The Organisational System**

![Fig 2.4](image)
As shown in Figure 2.4, the organisation system provides products and services for the environment system, the organisational information system provides all the data and information needed by the organisational system and the Management Information System provides the management oriented planning and control information for the organisational information system.

**MIS Structure**

![MIS Structure Diagram](image)

**Figure 2.5**

*Carl Heyel* 19 held, “Management Information systems are planned and organised approaches to supplying executives with intelligence aids that facilitate the managerial process.” *Walter J. Kennevan* 20 explained MIS in *Figure 2.5* provided those involved were relatively close in their experience and
knowledge. The similarly of purpose and experience of the individuals in such circumstances usually allow a close communication between them and facilitate in the interaction between their respective stores of information.

In more recent time, an increasing proportion of our affairs have been conducted by large organisations. Many of the smaller enterprises have been superseded by large corporations or incorporated into them. Private business and industry have grow in the size and scope of the national economies of the leading industrial nations have expanded.

The development of modern economies has a number of effects on the organisations involved in both public and private sectors. In the first place, the growth of organisations had made it much more difficult for one man to control and direct the activities of an enterprises in the manner as the owner of the country store can do. As the staff of organisation increased, the amount of authority that must be delegated naturally increases, too Responsibility for routine activities and the accompanying decisions is delegated to managers at the middle and the lower level of the organisation Senior management concerns itself with the less routine activities of planning and policy making.

A necessary counterpart of delegation of authority is the reporting of result of the activities that have been assigned. Delegation of authority must, therefore, be accompanied by
the establishment of the communication channel through which these results can be reported and discussed. The greater the degree of delegation, the larger is the number of communication channels needed as part of the information system.

A second effect of the growth of an organisation is that the breadth of experience and knowledge of individual members of the organisation tend to decline. In the early stages of expansion, the owner, president or director of a small organisation usually does the hiring itself, normally choosing persons with whom he can communicate easily and readily. As the organisation grows, however, the hiring process itself is delegated. The delegation of hiring authority usually results in the hiring of individuals with a wider range of characteristics. It is quite common that individuals with different backgrounds place different interpretations upon information that has been acquired. This diversity of viewpoint often is a source of strength to an organisation. It can, however, be a cause of misunderstanding. For this reason, greater attention to communication between individual members is needed as the organisation grows in size. This need is particularly acute if the expansion of the organisation involves geographic dispersion of units.

Another factor with which modern organisations must contend is the greatly increased complexity of the activities
in which they are involved. This complexity is due inmost part to the place and pattern of modern life and has led to an increased degree of specialization by those who in organisation. Increased specialization tends to decrease the amount of knowledge and experience common among members of an organisation. In addition, specialization encourages communication between those with similar backgrounds and decreases passage of information between individuals with different interests and specialisation.

The complexity of the external environment in which modern organisations operate has greatly increased the amount of information that must be processed within organisation. The nature of the modern environment has also increased the complexity of the necessary information handling. A striking example of this increased complexity is the administration of a company payroll. The owner of the proprietary shop usually paid an employee a previously agreed upon the amount withdrawn directly from the cash register. The owner then charged the amount to cost. A modern payroll system has the same basic function. However, modern social conditions require that a payroll system also incorporate a large number of other features. Modern payroll systems are usually required to make deductions from the gross pay for some of the following: income taxes, pension schemes, taxable allowances and benefits, union dues, parking fees, payroll savings plans, disability,
insurance and numerous other social and administrative functions. As a result, a modern payroll system is very large and complicated operation usually requiring computer support to accomplish the necessary data processing tasks.

Organisations have met the demands of the increased complexity of their activities by diverting an increase proportion of their effort and resources to administrative tasks and information systems.

In the early Twentieth Century, the information gathering activities were devoted almost entirely to reporting the financial condition of the organisation. As managerial skills developed to economies were introduced under the general headings of management accountings for evaluations of the efficiency of sub-components of the organisation in a market oriented economy.

The early information systems were oriented exclusively towards the financial and managerial accounting functions. It is note-worthy that the main initial effect of the introduction of the computer into organisations was an increase in the amount of routine clerical and data manipulating capacity available to the accounting function. Design and implementation of information systems was often entirely in the hands of accountants. The concept of an information system designed to serve a wide range of managerial functions was often given little attention. Primary emphasis at the time was often given
to the work involved in introducing the new computer supported financial and accountings systems.

The idea of an information system to guide management decisions predates the use of computers which have extended the organisational capabilities of implementing such a system. Evolution of MIS concepts can be summed up by four major areas of system development. There are Managerial Accounting, Management Science, Management Theory, and computerisation. Indeed the concepts of MIS can be viewed as substantial extension of these concepts.

**Role of M.I.S. in Organization**

An organisation does not need a jungle of information. The information has to be specific, precise and just according to the need of the planning pattern. Excessive information may sometimes lead to confusion and chaos. It may involve unnecessary expenses. It is true that “Too much information available but not used can be a costly waste, it is unrelated or even undigested information then it tends to confuse Management. Obviously, there is a definite need to examine carefully incoming data so that relevant usable information may be the result. This requires discriminating, selecting, relating, and classifying of information in a form usable at specific echelon of Management. Failure to relate, classify and utilize information smacks of disorganisation and provides a strong raisen ‘d’ etre’ for the establishment of information system.
Management process cannot function without basic factual information and knowledge about the day-to-day actions and reactions of the workers. It cannot plan with precision unless it has information about the past profitability, return on investment, share of market, service conditions of workers, execution of the plan, market conditions financial implications, price structure and supply of raw materials including its sources.

To sum up "Management needs information so that it can plan intelligently for the future." Basic questions may be asked that assist management in differentiating what type of information are required. The informational needs of management with reference to the overall functions of an enterprise may fall under three categories as shown in figure 2.6.

**Functions of an Institution**

![Figure 2.6](image-url)
**Environmental**

Environmental conveys the socio economic climate of the situation.

**Competitive**

There are three main points to be considered while supplying data competitive information:

(a) *Past performance*: This includes information on the profitability, return on investment, share of market, and so forth of competing companies. Such information is primarily useful in identifying one's competitors. It also is one benchmark when setting company objectives.

(b) *Present activity*: This covers new product introductions, management changes, price strategy and so on all-current developments. Good intelligence on such matters can materially influence a company's planning as it may lead to modifying marketing strategy.

(c) *Future plans*: This includes information or acquisition, intentions, facility plans and research and development efforts.

**Internal**

The third and final category of planning information is made up of internal data. As it relates to the total planning process, internal data are aimed at identifying a company's strengths and weaknesses, when viewed in the perspective
of the general business environment and in the light of competitive activity, should help management to shape its future plans.

From the above description it is clear that there is a great need of the management information system in an organisation. Viewing the need the MIS it can be realized that MIS plays a tremendous role in the smooth running of an enterprise.

(i) Establishment of relationship among functional departments of an undertaking:

There is considerable interdependence among various departments in view of information requirement. The data needed for the production of goods are also needed by marketing department to prepare the marketing strategy.

(ii) Processing of data:

The more provision of raw data is not sufficient for the running of a business or any institution. The provided data require to be sorted, arranged, aggregated and transformed to suit the purpose. In other words unless the data are processed, they are meaningless. Some resources have to be developed to process data. If the data management systems are not systematized correctly and properly, then, more efforts would be required for the same processing. Sometimes it may result in duplication of efforts. MIS is the only tool by which such obstacles can be avoided.
(iii) **Prevention of sub-optimization of functional objectives:**

The functional objectives of an organisation synchronised in such a way that the total objectives are achieved. The managerial coordination and control system based on sound management information system establishes reasonable balance between organisational goals and the subgoals and also among the sub-goals.

(iv) **MIS increases predictability:**

In the real world the decision environment of the administrator may have three elements; certainty, risk and uncertainty. The manager may have full knowledge and information on certain factors, partial information on a few and no information on others. One cannot say that everything is certain or uncertain. By and large managers operated in an environment of relative complexity, diversity and uncertainty. MIS reduces uncertainty of the decision making. The models can be used for generating information and evaluation of alternatives.

Thus the realization of the importance of information in management has given a unifying theme for various activities of the systems group and the systems function has been evolved as an integral part of modern management.

**Universality of the Concept**

General principles and functions of management are flexible and capable of adopting themselves to every need.
To Henri Fayol\textsuperscript{1}, "This code is indispensable. Be it a case of commerce, industry, politics, religion, war or philanthropy in every concern there is a management function to be performed and for its performance there must be principles, that is to say acknowledged truths regarded as proven on which to rely. And it is the code which represents the sum total of there truths at any given moment." The universality of management principles and functions makes, MIS universal.

The need and importance of information can not be avoided whether it is a commercial undertaking or a charitable institution, whether it is a private or a public undertaking, whether it is a big or a small undertaking. And even it will not make much difference whether a country is a capitalist or socialist.

It is argued that the information system can be applied in the management of households, clubs, churches, schools, universities, hotels and other non business institutions. Thus the universality of the concept is not restricted to certain undertakings, nations or societies of the world. However, the degree of information needed for various parts of society may differ and the method of information system may even be traditional or scientific.

Higher learning is a next ladder to the college, secondary and primary education. To meet the economic problems spreading over the economy, higher learning is the process through which
economy can bring socio economic transformation in the society. To merge a stable and integrated society for nation-building the following means are adopted.

1. The stabilization of internal faction and the promotion of domestic tranquility.

2. The consolidation of cultural competencies and the improvement of the quality of people lives and hence the vitality of the nation.

3. The creation of a strong economy which will act as the stimulus on which other programmes can be built.

The institutions of higher learning play a tremendous role in achieving the goal of nation building through the above means. The Late Pt. J. Nehru viewed thus the objectives of the University in his convocation address to the University of Allahabad in 1947: “The University stands for humanism, for tolerance, for reason, for adventures of ideas and for the search of truth. It stands for the onward march of human race towards, even higher objectives. If the universities discharge their duties adequately, then it will with the nation and the people.”

Institutions of higher learning hold a position of eminence and academic excellence they occupy the apex of a pyramid whose base is constantly widening consequent on the increasing awareness, particularly among developing societies,
of the importance of education. The economic development of a nation is now, more than ever before, intervened with the educational attainment. No country and no people have a chance of entering the modern world with only a small fraction of its population possessing education beyond the secondary level. University education has, therefore, become an important concern of society and the focus of critical assessment. The University is defined as a body of academic people engaged in the pursuit of academic matters.

The association between the knowledge and skills possessed by the products of the institutions of higher learning and the needs of economy are no longer accidental. The demands made by economy on institutions of higher learning are threefold:

1. An abundant steady stream of skilled manpower to fill the traditional occupations, reoriented to the new developments in technology and social exigencies: as well as the varied positions that emerge with new industries.

2. A solid base of optimum education for the nation as a whole, since in a society moving towards modernization, education beyond the school level becomes essential here.

3. Scientific research to facilitate the progress of economy and to explore new avenues of development.
Universities will have to be engaged in the process of equipping individuals to create knowledge, to be alert to new ideas, to see a problem which is not openly evident and to acquire the self confidence necessary to meet the future challenges. In brief, objectives of university may be laid down as follows:

1. To assist in the promotion of national integration and unity.

2. Since skilled and trained manpower is one of the most critical economic requirements confronting institution of higher learning in developing countries, meeting the manpower needs of the nation is particularly important objective of the universities.

3. To rectify existing imbalances in educational opportunities among racial and income groups, rural and urban areas and between the developed and less developed regions.

4. Through their research function the universities realize that this has to be geared towards studying and finding solution to serious national problems.

It is worthy noted that even university as an institution of higher learning could not be escaped from the complicity prevailed in total environment, the simple task of the university administration has turned down to tedious job of planning, controlling and directing the work of the university. Development
in the fields of automation, computer technology and information system can not be ignored in the working of the university.

But it is surprising to find that even those institutions of higher learning which conduct managerial courses of industry personnel do not provide the similar facility for their own administrators. Only for the reason an adequate information system which forms the basis for all developmental programmes is lacking in universities.
References

7. Ramchandran K.K., (1996), Management Information System, A study in a University, (University News, June 3.)


16. **Carl Heyel**, et al.


19. **Carl Heyel**, et al.


21. **Henry Fayol** et al.