1. INTRODUCTION TO MANAGEMENT INFORMATION SYSTEMS

1.1 MIS definition

The Management Information System (MIS) is a concept of the last decade or two. It has been understood and described in a number ways. It is also known as the Information System, the Information and Decision System, the Computer-based information System.

MIS has more than one definition, some of which are given below.

1. MIS is defined as a system which provides information support for decision making in the organization.
2. MIS is defined as an integrated system of man and machine for providing the information to support the operations, the management and the decision making function in the organization.
3. MIS is defined as a system based on the database of the organization evolved for the purpose of providing information to the people in the organization.

Though there are a number of definitions, all of them converge on one single point, i.e., the MIS is a system to support the decision making functions in the organization. The difference lies in defining the elements of the MIS. However, in today’s world MIS is a computerized, business processing system generating information for the people in the organization to meet the information needs and assisting in taking decisions to achieve the corporate objective of the organization and in the Public sector MIS is designed to deliver services to the citizen also.
1.2 Introduction to Management Information Systems (MIS)

Management information system (MIS) provides information that organizations require to manage themselves efficiently and effectively. Management information systems are typically computer systems used for managing the organizations. The five primary components of MIS are: 1) Hardware 2) Software 3) Data (information for decision making), 4) Procedures (design, development and documentation), and 5) People (individuals, groups, or organizations).

Management information systems are distinct from other information systems because they are used to analyze and facilitate strategic and operational activities. Academically, the term is commonly used to refer to the study of how individuals, groups, and organizations evaluate, design, implement, manage, and utilize systems to generate information to improve efficiency and effectiveness of decision making, including systems termed decision support systems, expert systems, and executive information systems.

1.3 Management Information Systems (MIS) Concept

The concept of the MIS has evolved over a period of time comprising many different facets of the organizational function. MIS is a necessity in all the organizations. The initial concept of MIS was to process the data available in the organization and present it in the form of reports at regular intervals. The system was largely capable of handling the data from collection to processing. It was more impersonal, requiring each individual to pick and choose the processed data and use it for his requirements. This
concept was further modified when a distinction was made between data and information. Information is a product of an analysis of data. This concept is similar to a raw material and the finished product. However, data can be analyzed in a number of ways, producing different shades and specifications of the information as a product. It was, therefore, demanded that the system concept be an individual-oriented, as each individual may have a different orientation towards the information.

This concept was further modified, that the system should present information in such a form and format that it creates an impact on its user, provoking a decision or an investigation. It was later realized then even though such an impact was a welcome modification, some sort of selective approach was necessary in analysis and reporting. Hence, the concept of exception reporting was imbibed in MIS. The norm for an exception was necessary to evolve in the organization. The concept remained valid till and to the extent that the norm for an exception remained true and effective. Since the environment turns competitive and is ever changing, fixation of the norm for an exception becomes a futile exercise at least for the people in the higher echelons of the organization. The concept was then evolved that the system should be capable of handling a need based exception reporting. This need maybe either of an individual or a group of people. This called for keeping all data together in such a form that it can be accessed by anybody and can be processed to suit his needs. The concept is that the data is one but it can be viewed by different individuals in different ways.

Over a period of time, when these conceptual developments were taking place, the concept of end user computing using multiple databases emerged. This concept brought a
fundamental change in MIS. The change was decentralization of the system and the user of the information becoming independent of computer professionals. When this becomes a reality, the concept of MIS changed to a decision making system. The job in the computer department is to manage the information resource and leave the task of information processing to the user. The concept of MIS in today’s world is a system which handles the databases, provides computing facilities to the end user and gives a variety of decision making tools to the user of the system and also enable the citizens / beneficiaries to use the MIS from external source and connect with organization.

The concept of MIS gives high regard to the individual and his ability to use information. MIS gives information through data analysis. While analyzing the data, it relies on many academic disciplines. These include the theories, principles and concepts from the Management Science, Psychology and Human Behavior, making the MIS more effective and useful. These academic disciplines are used in designing the MIS, evolving the decision support tools for modeling and decision making.

The foundation of MIS is the principles of management and its practices. The concept of management Information System can be evolved for a specific objective if it is evolved after systematic planning and design. It calls for an analysis of a business, management views & policies, organization culture and the management style. Information should be generated in this setting and must be useful in managing the business. This is possible only when it is conceptualized as a system with an appropriate design. MIS, therefore, relies heavily on the systems theory and offers solutions to handle the complex situations of the input and output flows. It uses theories of communication
which helps to evolve a system design capable of handling data inputs, process, and outputs with the least possible noise or distortion in transmitting the information from a source to a destination. It uses the principles of system design, viz., an ability of continuous adjustment or correction in the system in line with the environmental change in which the MIS operates. Such a design helps to keep the MIS tuned with the business managements needs of the organization.

The concept, therefore, is a blend of principle, theories and practices of the Management, Information and System giving rise to a single product known as Management Information System (MIS).

1.4 History of MIS

Kenneth C. Laudon and Jane Laudon identify five eras of Management Information System evolution corresponding to the five phases in the development of computing technology: 1) Mainframe and minicomputer computing, 2) Personal computers, 3) Client/server networks, 4) Enterprise computing, and 5) Cloud computing.

The first era (mainframe and minicomputer) was ruled by IBM and their mainframe computers. These computers would often take up whole rooms and require teams to run them - IBM supplied the hardware and the software. As technology advanced, these computers were able to handle greater capacities and therefore reduce their cost.

The second era (personal computer) began in 1965 as microprocessors started to compete with mainframes and minicomputers and accelerated the process of
decentralizing computing power from large data centers to smaller offices. In the late 1970s minicomputer technology gave way to personal computers and relatively low cost computers were becoming mass market commodities, allowing businesses to provide their employees access to computing power that ten years before would have cost lakhs of rupees.

As technological complexity increased and costs decreased, the need to share information within an enterprise also grew, giving rise to the third era (client/server), in which computers on a common network access shared information on a server. This lets thousands and even millions of people access data simultaneously. The fourth era (enterprise) enabled by high speed networks, tied all aspects of the business enterprise together offering rich information access encompassing the complete management structure. Every computer is utilized.

The fifth era (cloud computing) is the latest and employs networking technology to deliver applications as well as data storage independent of the configuration, location or nature of the hardware. This, along with high speed cell phone and Wi-Fi networks, led to new levels of mobility in which managers access the MIS remotely with laptop and tablet computers, plus smart phones.

1.5 Physical view of MIS

The Physical view of the MIS can be seen as an assembly of several subsystems based on the databases in the organization. These subsystems range from data collection, transaction processing and validating, processing, analyzing and storing the information
in databases. The subsystem could be at a functional level or a corporate level. The information is evolved through them for a functional or an operational management and it provides the information for the management of business at the corporate level and also analyzes and provides huge data for the governments in a systematic way for analysis and for designing welfare schemes.

MIS, therefore, is a dynamic concept subject to change, time and again, with a change in the business management process. It continuously interacts with the internal and the external environment of the business and provides a corrective mechanism in the system so that the changed needs of information are met effectively. MIS, therefore, is a dynamic design, the primary objective of which is to provide the information for decision making and it is developed considering the organizational fabric, giving due regard to the people in the organizational the management functions and the managers and the managerial control.

1.6 Role of Management Information Systems in an Organization

The role of the MIS in an organization can be compared to the role of heart in the body. The information is the blood and MIS is the heart. In the body the heart plays the role of supplying pure blood to all the elements of the body including the brain. The heart works faster and supplies more blood when needed. It regulates and controls the incoming impure blood, processes it and sends it to the destination in the quantity needed. It fulfills the needs of blood supply to human body in normal course and also in crisis.

MIS plays exactly the same role in the organization. The system ensures that an appropriate data is collected from the various sources, processed, and sent further to all
the needy destinations. The system is expected to fulfill the information needs of an individual, a group of individuals, the management functionaries, the managers and the top management. MIS satisfies the diverse needs through a variety of systems such as Query Systems, Analysis Systems, Modeling Systems and Decision Support Systems, MIS helps in Strategic Planning, Management Control, Operational Control and Transaction Processing.

MIS helps the clerical personnel in the transaction processing and answers their queries on the data pertaining to the transaction, the status of a particular record and references on a variety of documents. MIS helps the junior management personnel by providing the operational data for planning, scheduling and control, and helps them further in decision making at the operations level to correct an out of control situation.

MIS helps the middle management in short them planning, target setting and controlling the business functions. It is supported by the use of the management tools of planning and control. MIS helps the top management in goal setting, strategic planning and evolving the business plans and their implementation. MIS plays the role of information generation, communication, problem identification and helps in the process of decision making. MIS, therefore, plays a vital role in the management, administration and operations of an organization.

1.7 Impact of MIS on an organization

Since the MIS plays a very important role in the organization, it creates an impact on the organization’s functions, performance and productivity. With good support, the
management of marketing, finance, production and personnel become more efficient. The tracking and monitoring of the functional targets becomes easy. The functional, managers are informed about the progress, achievements and shortfalls in the probable trends in the various aspects of business. This helps in forecasting and long term perspective planning. The manager’s attention is brought to a situation which is exceptional in nature, inducing him to take an action or a decision in the matter. A disciplined information reporting system creates a structured data and a knowledge base for all the people in the organization. The information is available in such a form that it can be used straight away or by blending analysis, saving the manager’s valuable time.

MIS creates another impact in the organization which relates to the understanding of the business itself. MIS begins with the definition of a data entity and its attributes. It uses a dictionary of data, entity and attributes, respectively, designed for information generation in the organization. Since all the information system use the dictionary, there is common understanding of terms and terminology in the organization bringing clarity in the communication and a similar understanding throughout the organization. MIS calls for a systemization of the business operation for an affective system design.

A well designed system with focus on the manager makes an impact on the managerial efficiency. The fund of information motivates an enlightened manager to use a variety of tools of management. It helps him to resort to such exercises as experimentation and modeling. The use of computers enables him to use the tools techniques which are impossible to use manually.
Since the MIS works on the basic systems such as transaction processing and databases, the drudgery of the clerical work is transferred to the computerized system, relieving the human mind for better work. It is observed that a lot of manpower is engaged in this activity in the organization. The study of the individual’s time utilization and its application has revealed that seventy percent of the time is spent in recording, searching, processing and communication. This is a large overhead in the organization. MIS has a direct impact on this overhead. It creates an information based work culture in the organization.

1.8 MIS: A support to the Management

The management process is executed through a variety of decisions taken at each step of planning, organizing, staffing, directing, coordinating and control. MIS aids in decision making if the management is able to spell out the decisions required to be taken. The objective of the MIS is to provide information for a decision support in the process of management. It helps in such a way that the business goals are achieved in the most efficient manner. Since decision making is not restricted to a particular level, MIS is expected to support all the levels of the management in conducting the business operations. Unless MIS becomes a management aid, it is not useful to the organization.

1.9 Factors contributing to the success of MIS in PSUs

If an MIS has to become successful then it should have all the features listed as follows.

- MIS is integrated into the managerial functions. It sets clear objectives to ensure that the MIS focuses on the major issues of the business. Adequate development
resources are provided and the human & organizational barriers to progress are removed.

- An appropriate information processing technology required to meet the data processing and analysis needs of the users of the MIS is selected.
- MIS is oriented, defined and designed in terms of the user’s requirements and its operational viability is ensured.
- MIS is kept under continuous surveillance, so that its open system design is modified according to the changing information needs.
- MIS focuses on the results and goals, and highlights the factors and reasons for non-achievement.
- MIS is not allowed to end up into an information generation mill avoiding the noise in the information and the communication system.
- MIS recognizes that a manager is a human being and therefore, the systems must consider all the human behavioral factors in the process of the management.
- MIS recognizes that the different information needs for different objectives must be met with. The globalization of information in isolation from the different objectives leads to too much information and its non-use.
- MIS is easy to operate and, therefore, the design of the MIS has such features which make up a user-friendly design.
- MIS recognizes that the information needs become obsolete and new needs emerge. MIS design, therefore, has a basic potential capability to quickly meet new needs of information.
MIS concentrates on developing the information support to manage critical success factors. It concentrates on the mission critical applications serving the needs of top management.

1.10 Factors contribution to MIS failure in PSUs

Many a times MIS is a failure in PSUs. The common factors which are responsible for this are listed as follows.

- MIS is conceived as a data processing tool and not as an information processing tool and MIS does not provide that information which is needed by the managers but it tends to provide the information generally the function calls for. In this case MIS becomes an impersonal system.
- Underestimating the complexity in the business systems and not recognizing it in the MIS design leads to problems during implementation.
- Adequate attention is not given to the quality control aspects of the inputs, the process and the outputs leading to insufficient checks and controls in the MIS.
- MIS is developed without streamlining the transaction processing systems in the organization and lack of training on MIS to stakeholders. Failing to appreciate that the users of the information and the generators of the data are different and not identifying that both of them have to play an important & responsible role in the MIS.
- MIS does not meet certain critical and key factors of its users such as, response to the query on the database, inability to get the processing done in a particular manner, lack of user-friendly system and dependence on the system personnel.
A belief that the computerized MIS can solve all the management problems of planning and control of the business and lack of administrative discipline in following the standardized systems and procedures, faulty coding and deviating from the system specifications result in incomplete and incorrect information.

1.11 Advantages of MIS

The following are some of the benefits that can be attained from MIS.

Organizations are able to highlight their strengths and weaknesses due to the presence of revenue reports, employees' performance records etc. The identification of these aspects can help the company improve their business processes and operations. MIS gives an overall picture of the company and acts as a communication and planning tool.

The availability of customer data and feedback in the MIS can help the company to align their business processes according to the needs of the customers. The effective management of customer data can help the company to perform direct marketing and promotion activities. MIS can help an organization to gain a competitive advantage. Competitive advantage is a firm’s ability to do something better, faster, cheaper, or uniquely, when compared with rival firms in the market.

1.12 MIS in Public Sector Organizations

Public administration in Government and PSUs has changed considerably over the past few years as did the use of MIS. A ‘stage of growth’ frame work is developed and used to describe the relations between various government departments and use of MIS over a period of time. This framework was applied to certain large public sector
organization and it was found that the use of IS in the PSUs did not develop according to the needs and developments in the organization over the past few years. Communication and Information are the lifeblood of any organization. Neither planning nor designing nor any other managerial process is possible without them. Communication may be viewed as the process of exchange of information, it provides the means of contact between organizational members and organizational decision centers.

In the recent times, government organizations are inundated with data and information that are either generated by internal government transactions or gathers from outside sources. Such data and information are needed for designing future welfare schemes by the government. The government officials must equip themselves to cope up with the phenomenon of information explosion, not to be buried in the avalanche of irrelevant data. They must manage information, that is, a system or structure must be developed to collect, organize, process and disseminate the right type of information at the right time to the right person. Awareness of this need is very essential in the development of MIS for public sector organizations. IT is transforming not only the functioning of the government organizations and its processes but is also redefining the existing systems in the bureaucratic setup at a very faster pace.

In the coming decade most of the citizens would become IT savvy and the PSUs must therefore be prepared to offer services tailored to the citizens needs. MIS has evolved as an integration system for financial transactions, procuring, delivery of services online, auditing etc…It has become very essential for the staff in the PSUs to use MIS almost for every work. Under these circumstances, MIS is expected to provide the staff
with various sets of information for decision making and better communication environment which can be used just on the computer terminal for everyday’s work. Furthermore communication between the head office and regional offices has become more and more necessary in the recent times.

IT is a resource for PSUs to use in the processes and activities of the organization. But the similarity of IT with other technologies end here. While other technologies tend to be applicable only in specific areas and in well defined areas of operation, the potential uses for IT in government sector is universal. IT can be used both in operational and management processes in the PSUs.

There are an estimated 5870 public sector corporations in the entire country which are either partially or fully funded either by the central government or respective state governments. This huge number should have driven the MIS market in PSUs in a big way but on the contrary MIS in PSUs is still in an early growth stage. It is a small market dominated by in-house implementations and customized solutions developed by small local software developers. In terms of technology adaptation, the Indian market is far behind its counterparts such as China, South Korea, Singapore and Malaysia. Undoubtedly the Indian PSUs have been very late in realizing the advantages of IT. Lack of awareness, low priority given to financing of IT related investments, lack of suitable solutions as well as absence of professional decision making has led to low penetration of MIS in PSUs.

a) Low priority to spending on IT by PSUs.
PSUs in India give IT budgeting a very low priority as compared to their counterparts in the private sector. PSUs don’t mind spending crores of rupees on infrastructure but are very skeptical about spending in the field of IT.

b) Lack of Professional decision making

Ideally the team involved in decision making for the selection of MIS should comprise the PMU consisting of domain expert, top bureaucrats and IT staff but in the PSUs the officials supervising the IT projects are CIOs or IT Managers who do not have functional domain knowledge.

c) Lack of suitable solutions

Most of the PSUs of the Govt. of India have gone for in-house solutions or built a customized one from software agencies since appropriate MIS suitable for PSUs are not available in the market today.

d) Lack of awareness

Many PSUs have still not realized that importance of implementing MIS and are not aware of the fact that MIS drives efficiency. They consider IT a capital intensive investment with little or no returns. This apathy towards MIS has proved to be a major discouragement. PSUs allocate shoe string budgets for MIS projects and develop in-house or customized solutions that fail to give them the desired results and do not meet the PSU requirements. Most of the PSUs which have implemented MIS do not take up all stake holders training. There have been many major IT initiatives by PSUs in India. However these initiatives have been confined to nava rathna PSUs. As more medium sized and small PSUs realize the advantages of implementing MIS, allocating higher
budgets for IT, there would be an enormous growth in the field of MIS and the PSUs would be able to serve the citizens in a much better and innovative way.

1.13 Centralized Vs Decentralized Management of Public Information Systems

In dealing with information systems, public sector organisations have to cover eight main areas of responsibility: information systems planning, organisational structures and staffing, data management, computing and data management architecture, information systems development, information technology acquisition, training, and technical support. Adopting a centralised approach to these responsibilities can bring efficiency benefits, but requires some severe constraints to be overcome. Adopting a decentralised approach can help spread computing in the organisation, but is often wasteful. A ‘core-periphery’ approach to public information systems, combining both central and local action, is therefore considered as being most effective.

1.14 MIS and Public Sector Accountability

Accountability in public sector reform can be defined as a desire to make public sector staff more accountable for their decisions and actions.

There is a broad set of accountabilities in the public sector, including:

Managerial accountability:

Political accountability:

Financial accountability:

Accountabilities in the Public Sector
1.15 Accountability outcome associated with the new computerized information systems in PSUs

Evidence is drawn here from a number of cases, from which emerge three principal accountability impacts associated with information systems, particularly computerised information systems in PSUs:

- Essential support for accountability
- Alteration of the balance of accountabilities, and
- Undermining of accountability.
Those information systems with just a monitoring mechanism merely support reporting: recipients have information on decisions and outcomes but cannot judge them. Those with monitoring and comparison mechanisms merely support openness: recipients can judge whether decisions and outcomes meet acceptable performance standards but can do nothing with this information. Only those information systems that provide monitoring, comparison and control mechanisms can be said to truly support accountability: allowing recipients to take actions that affect the source decision maker.

1.16 Failure, Success and Improvisation of Information Systems Projects in Developing Countries like India

Most information systems including current ICT projects in developing countries fail either totally or partially. Some of the failed MIS projects in the PSUs are as follows:

i) India's Indira Gandhi Conservation Monitoring Centre was intended to be a national information provider based on a set of core environmental information systems. Despite more than a year of planning, analysis and design work, these information systems never became operational, and the whole initiative collapsed shortly afterwards.

ii) Tax Computerisation Project in Bihars Revenue Department set out seven areas of taxation that were to be computerised. At the end of the project, only two areas had been partly computerised, and five others were not operational.

The Extent of Success and Failure

According to surveys, evaluations and analysis something like one-fifth to one-quarter of industrialised country IS projects fall into the 'total failure' category, something
like one-third to three-fifths fall into the 'partial failure' category, and the remaining minority fall into the 'success' category. There is no evidence, nor is there any theoretical rationale, to support the idea that failure rates in developing countries should be any lower than figures in the North. There is evidence and there are plenty of practical reasons – such as lack of technical and human infrastructure – to support the idea that failure rates in DCs might be higher, perhaps considerably higher, than this threshold.

Evidence to address the question, and move beyond the threshold estimations offered above, is very limited. The constraints on evidence are several:

- Lack of literature in general: until very recently, the entire literature on IS and developing countries would struggle to fill a single bookshelf. The attention of writers – from researchers to consultants to journalists – has been focused elsewhere.
- Lack of evaluation: those who have the will to evaluate – such as academics – often lack the resources and capacity. Those who have the resources – such as donor agencies - often lack the will to evaluate.
- Focus on case studies: the literature on IS in DCs has grown, but it is a literature dominated by case studies of individual IS projects. Taken alone, these provide no basis for estimation of overall failure/success rates.

Despite these limitations, there are some glimpses of evidence. "successful examples of computerisation can be found … but frustrating stories of systems which failed to fulfill their initial promise are more frequent". A few multiple-case studies have been conducted, with examples summarized below:
• Health information systems in AP: Widespread partial failure of high cost systems with little use of data.

• Donor-funded IT projects in Karnakataka: All were found to be partial failures. Likewise, reports from individual developing countries (e.g. World Bank 1993) find failure to be the dominant theme.

Learning from past failure and a rise in the absolute number of successful DC projects is likely to have occurred. However, it seems unlikely that this new discourse reflects a shift in the relative proportion of failures. Rather, it is the case writers and their environment that has changed, not the project outcomes. Donors, keen to justify their expenditure, wish to promote the 'good news' and ignore or suppress the bad. Writers – many more of whom are now practitioners rather than relatively more disinterested academics – are increasingly either donor-funded or seeking donor funds. They therefore follow a similar upbeat agenda. Finally, current literature appears to contain a greater proportion of pilots and proposals that, necessarily, emphasise potential benefits rather than actual negative outcomes. The new discourse therefore obscures rather than clarifies the true extent of success and failure, in which successes still form only a small minority of all IS initiatives in developing countries.

1.17 The context of Public Sector Reform

Public sector reform is, if generally defined, change within public sector organisations (PSOs) that seeks to improve their performance. As such, public sector reform has been an ongoing process since the inception of institutions that we might now label 'public sector'.
Where public sector crisis prompted the call "Something should be done", neo-liberal ideology provided the response "Something can be done" and, in some situations, political driving forces demanded that "Something will be done". This "something" has come in the form of various measures that fall collectively under the heading of 'public sector reform'. There is no consistent menu of elements that make up a programme of public sector reform. Typical components, however, include:

i) **Increased efficiency**: Improving the input:output ratio within the public sector; the rationale of such reforms is to address the large size of public sector expenditure and/or the inefficiency of many of its processes

ii) **Decentralisation**: The transfer of decision making to lower, more localised levels of the public sector; the rationale of such reforms is to reduce the costs of centralised decision making, and to create more flexible and responsive decision making

iii) **Increased accountability**: Making public sector staff more accountable for their decisions and actions. The rationale of such reforms is to increase the pressure on staff to perform well, to make them more responsive to recipient groups, and to reduce inefficient or corrupt practices.

iv) **Improved resource management**: Increasing the effective use of human, financial and other resources. The rationale of such reforms is clear from their definition. It often includes a refocusing of the way the performance of these resources is planned, measured and managed.

v) **Marketisation**: Increasing the use of market forces to cover relationships within the public sector, relationships between citizens and the public sector, and relationships and boundaries between public and private sector. The rationale of such reforms is that
market relations will drive costs down and increase efficiency and/or effectiveness of service delivery.

**The Information Age in India**

Almost simultaneous with the development of a reform agenda, there has been a growing sense in India of a real or impending ‘information age’. The roots of ideas about a new 'information age' – treated here as synonymous with emergence of an ‘information economy’, ‘information society’ or 'post-industrial society' – are invariably traced back to the work of writers such as Daniel Bell, Fritz Machlup, Yuji Masuda and Alvin Toffler. Through analysis of extant trends, they described a vision of a new world paradigm that was already coming into existence and that would increasingly develop. General features of this new paradigm include a domination of services over other economic sectors, niche instead of mass markets, and the emergence of a 'post-bureaucratic' form of organisation.

The early, and optimistic, writings about the information age have been much criticised. Critics argue:

- That things have not changed as much as predicted. Peasant farmers – who, with their families, form a major proportion of the world's population – continue to live and work much as they have ever done. They have yet to appreciate the pleasures of surfing the Net or teleworking. Even in the high citadels of the new world, shifts in working patterns and social life may be tangible and important, but they are not yet revolutionary.
• That, when things do change, there will be problems as well as benefits. The information age may be marked by higher living standards but also by unemployment, insecurity, electronic surveillance and alienation.

• That the technology focus of information age writing distracts us from the human, social and political factors which explain – and therefore ultimately determine – what happens in our world.

There is a great deal of validity in these criticisms, but what they do not deny is that – albeit slowly and unevenly, for better or worse – there are identifiable information age trends. Thus, while the concept of an information age retains a large measure of hyperbole, it does serve to highlight important trends that are shaping the world in which we live.

It is certain that they have begun to shape the economic and political context in India. While many see the 2000s as something of a ‘lost decade’ for India in computing terms, the country more than made up in the 2010s. The 2004 to 2011 period in office of ‘Rajasekhara Reddy, CM of AP and his computer boys’ marked a defining moment during which India’s image and activity as a global software player really began to take off, and during which a clear link was made between computing and reform of Indian public administration.

Although information technology (IT) has never since been so heavily-championed at such a high level in government, the catalytic actions of the 2010s set loose two specific, related and seemingly unstoppable information age trends in India:
• The increasing importance of information, including the increasing visibility and value of information systems.
• The increasing use of information technology.

For the public sector in India, this means that one can therefore see a trend of ‘information age reform’ that combines the existing reform agenda with the promise of the information age. Indeed, from humble beginnings in the Indian Statistical Institute in 1956, government expenditure on IT has grown considerably over the past few years.

Information age reform is therefore a growing reality for India which means two things that are different from traditional reform:
• First, a much greater (i.e. more overt) role for information and information systems in the processes of change in the public sector.
• Second, a much greater (i.e. more widely employed) role for information technology in the processes of change in the public sector.

1.18 Understanding information age reform failure in the Indian context.

One is naturally drawn to analyse why failure should be so prevalent in India. There are almost as many explanations for failure as there are information systems. However, one key factor that emerges again and again from case study analysis is the attitude and actions of senior public officials, both politicians and managers. A ‘four Is’ model of different approaches to information age reform, that appear over time, has been described in detail in the following paras. This model helps in understanding this concept in a better and clear manner.
I) The ‘Ignore’ Approach

In this case, public officials are ignorant about IT and information systems. They therefore do not include consideration of either in their plans for reform. IT expenditure is minimal or non-existent. This approach does not constitute information age reform. Nevertheless, this approach is still found in many – perhaps even most – Indian public sector organisations. This is sometimes even so when computers are present for, in some cases, those computers remain unused and merely act as costly ‘executive paperweights’.

ii) The ‘Isolate’ Approach

In this approach, public officials remain computer-illiterate and lack an understanding of information’s role. They nevertheless are aware of IT and its potential. Investment in IT is therefore included in reform plans but is seen as the separate responsibility of ‘computer experts’. It is mainly associated with automation and some idea that efficiency gains will result. For other reform agendas, it is added as an afterthought and is not linked in any systematic way to the process of reform. This, nonetheless, represents the first step on the path of information age reform. The early years of the CRISP project is an example of the isolate approach. In this case, the introduction of computers was seen as the responsibility of technical staff rather than being something in which mainstream managers should become involved. As a result, huge investments made very little contribution to reform agendas in the CRISP project.

iii) The ‘Idolise’ Approach

In this approach, public officials have become semi-literate. They use computers and are over-aware of IT’s potential. They believe that IT can transform the business of
government. They are dimly aware that information is something important. The public sector becomes awash with IT-driven reform projects which place technology at the heart of the change process. This approach has recently leapt to prominence thanks to N. Chandrababu Naidu, Chief Minister of Andhra Pradesh state. He launched a high-profile project – the LEAP21 (Leadership and Excellence in Andhra Pradesh in the twenty-first century) initiative – that exactly fits the idolise description. This initiative aims to use IT as a main lever in the creation of better government in Andhra Pradesh and, more generally, ‘focuses … on using Information Technology as a strategic tool for improving the quality of life for the people of Andhra Pradesh.’.

Chief Minister Naidu’s intention of using state promotional interventions to support the development of the IT industry and IT technological capabilities is based on sound historical precedent. However, his hopes of driving public sector reform with IT are not. There is a long history of failure to deliver reform objectives via technology-driven projects.

Even where technology-centered projects initially appear to succeed in delivering reform objectives, it is warned that they may not be sustainable or replicable since they so often depend on a single ‘idolising’ figurehead. When that senior official transfers to a new post, the project often collapses; when other organisations try to copy, failure ensues because the originator’s drive or skills are lacking; and copying rarely takes place because ‘a replication will never attract the same attention as a first time use’. In all situations, the cause is the lack of the original IT-focused champion. Another DSS used to support improved planning of resource usage in two zonal railways which was never
used in other zones. With LEAP21 so focused on Naidu himself, prospects are limited for the sustainability and replication of any successes it may fortuitously achieve.

**iv) The ‘Integrate’ Approach**

In this approach, public officials have become information-literate. They recognise information as a key organisational resource that is central to all government functions. IT is relegated to a secondary role: it is seen as a valuable means to achieve certain reform ends, not as an end in itself. The reengineering of information systems and the introduction of IT are now fully integrated into the process of organisational change, driven by reform objectives.

The integrated approach therefore places information in the driving seat, relegating technology to an important but enabling role. In very simple terms, we can see four main steps in initiation of this approach:

1. Acceptance by key stakeholders of the need for reform.
2. Identification and communication of an agenda for reform.
3. Identification of the new and/or reengineered information systems requirements of this reform agenda.
4. Identification of the role, if any, that information technology has to play in meeting these requirements.

The successful computerisation of passenger reservations on Indian Railways can be seen to have followed this route. The need for reform of reservations was understood since at least the mid-1970s, with an agenda of modernisation widely discussed and the need for reengineering of systems to escape the old ‘one-train-per-clerk’ situation widely
accepted. Information technology was then identified as the servant of this pre-existing reform agenda, not as the master of reform. Despite undeniable hiccups, this project was kept on track thanks to a vision of efficiency, accountability and customer service objectives that was shared by key stakeholders, not held by just one champion. As a result, technology solutions were shaped to fit reform objectives rather than vice versa, as is so often the case in examples of the idolise approach.

However, other examples of the integrated approach hardly exist in India. Approaches and chronologies remain unevenly distributed in India, but it is seen that much of the public sector still struggling to move away from the ignore stage. If anything, it seems likely to move on to ‘idolise’, as exemplified by the LEAP21 initiative, rather than ‘integrate’.

Despite the potential of information age reform, there remain substantial problems a) for the Indian public sector to enter the information age reform era at all; and b) for it to move on within that era to an integrated approach that will use IT to effectively enable delivery of reform objectives.

There is no magic recipe for ensuring widespread use of the integrated approach but education and training must surely form a substantial part of the package. Yet any review of current public administration training programmes in India will show that most can be described as ‘ignore going on idolise’ in their approach. There is little attempt to build the hybrid managers – spanning managerial, IT and IS skills – that information age government requires. These skill sets remain un-integrated within current training and often ignored. Some potential public employees and in-service trainees may gain
computing skills on their training programmes, but they do not gain information or information systems knowledge and skills. Any view of IT beyond the hands-on is typically simplistically-positive.

Not only does this hamper integrated approaches today, it also hints at a dangerously self-reinforcing spiral. If the present generation of Indian public managers cannot value or manage information, that sets the ‘information-blind’ agenda for current training and debate, thus ensuring that the next generation, too, will be unable to value or manage information. A similar spiral runs the risk of developing a ‘blinded by computers’ agenda of IT idolatry. Indian public managers will also need to adopt a more strategic approach to change that drives technology needs from information needs, and information needs from reform objectives. Strategic information systems planning of this type is very much in vogue in the private sector, though the application of such techniques in practice and in the public sector remains questionable. Perhaps more realistic is a ‘core-periphery’ approach that balances strategic and tactical, central and local needs.

Finally, encouraging an integrated approach will require cultural and structural changes in the Indian public sector to ensure that technology is the servant of reform. Such changes are never quick and so the move to an integrated approach can only be seen as a long-term process. In the interim, such information age reform initiatives as do take place in India are likely to remain dominated by isolate and, increasingly, idolise approaches. The true potential of information technology will therefore remain untapped in most cases, with initiatives undershooting in their delivery of reform objectives.
1.19 Conclusion to introduction chapter

As seen from the introduction to MIS, the Indian PSUs have been very slow to adapt the new trends in IT and though MIS have been developed by few PSUs they have not been able to deliver the desired output. The procedure employed to develop the MIS in most of the PSUs has not been correct and the appropriate software methodology of development of MIS has not been followed.

Most of the PSUs have not reengineered the exiting redundant systems before going for automation and MIS was designed by the PSUs without GPR (Govt. Process Reengineering) because of which considerable reluctance has been observed from the common man using the services of the PSUs. Indian PSUs have failed to use the latest technologies available in the market and have not incorporated sufficient safety measures while designing the MIS and more importance was given to the technical competence ignoring the domain knowledge. Common strategies for development of MIS have not been adopted by all the PSUs which developing the MIS and sometimes the wheel has been repeated instead of replicating the success achieved.

Hence it is clear that there is an urgent need to study current process of MIS development in PSUs and assesses its performance from the angle of all the stakeholders and evolve a common & successful theory for MIS software development and also give suggestions for improvement of MIS in PSUs.

1.20 Need for the Study

AP state has been the front runner in implementing MIS in various departments and has taken steps to offer large number of online services to the citizens. Most of the
departments like MGNREGS, Rural Development, transport, commercial taxes, excise, audit, treasury, police, medical & health, education, industries and welfare have implemented MIS

Though MIS have been implemented in most of the departments, the existing government processes have not been reengineered to make maximum impact. Most of the departments have not implemented Information systems 100% and still some processes are being operated manually. In PSUs when MIS has been implemented, because of lack of change management numerous apprehensions have cropped amongst the users and beneficiaries. Sylo MIS applications have been designed in most of the departments which does not communicate or share any information with other sister departments

Since the PSU practitioners have been slow to adopt the new trends in IT and MIS and since PSU’s play a crucial role in delivery of citizen centric online services to the citizens, the need for the study is felt. The study attempts to understand the usage of the MIS developed and used in the PSUs from the angle of the decision makers, other users and beneficiaries and identify the efficiency of the MIS and suggest changes for better service delivery to the citizens. The study also attempts to study and identify the best suited leadership approaches, software process and procedures for the software development of MIS in PSUs.

This study also attempts to fill a small part of the void by developing and testing an instrument that assessed some of the key attributes, behaviors and computing habits of the leaders, users and beneficiaries of the MIS in public sector organizations. There is a strong justification for conducting this study and targeting this population for several
reasons. First at this time, there is no generally accepted instrument that is available for
and tailored to this purpose and population. Second, MIS practitioners in PSUs have been
slow to adopt the new trends in information technologies. Yet, there is reason to believe
that this group of leaders and practitioners plays a key role in the future of MIS on all
fronts. Reliable baseline data will be very useful for long term planning purposes for
several stake holder groups. Third, there is a close match between the philosophical
foundations of IT and MIS which can be leveraged for the future. Fourth, the researcher
has identified and can gain access to a sample population for which the instrument can be
administered, field tested and validated.

The data from this study provided very useful benchmarking information for a variety
of audiences including IT system designers in both public and private sector
organizations, PSUs in both central and state governments and societies in the IT and
MIS sectors, researchers and educational and training institutions. Moreover as the
instrument becomes consistently and more widely used, it can provide a stream of useful
trend data or researchers can modify it to suit other research purposes or target
population.

1.2.1 Objectives of the study

MIS not only provides crucial data needed for top management for taking policy
decisions, it also provides online citizen centric services to the citizens by the Govt.
Departments and PSUs. However the MIS in PSUs lack behind their counterparts in the
private sector in providing quality services. The aim of this research is to identify the
requirements for MIS to assist in providing quality services both to the employees and to the citizens.

The objectives of the study are as follows:

a) To study the existing Management Information Systems at three Govt. organizations viz, MGNREGS (Rural Welfare Department) Tribal Welfare Dept and Civil Supplies Dept of Govt. of AP.

b) To assess the utility of the present Management Information Systems to the top executives/Govt. Officers, mid level officers/executives, IT Staff and to the beneficiary citizens

c) To identify the need for common requirements of information at different levels among the three organizations to develop and modify the Management Information Systems

d) To suggest improvements if any to the existing MIS for better functioning and to strive for delivery of improved services to the citizens and to the other stakeholders in line with the National E-Governance plan of the Govt. of India and in line with the latest technological advances in the field of information technology.

e) To identify and suggest the best leadership approaches, software process and procedures for development of MIS software in Public Sector Organizations.

**1.22 Hypothesis**

In view of the objectives of study, following hypotheses are formulated and tested

**H₀**: The present MIS systems in the PSUs are providing adequate desired information to the top managers on all aspects and are helpful in decision making.
**H₁**: The present MIS systems are able to deliver all the services to the citizens online and the customer satisfaction through online delivery of services through the MIS is high.

**H₂**: The present MIS in public sector organizations are using the latest advances in the field of IT and are abreast with technology in the development of MIS and the leadership approaches to MIS development, process and procedures of MIS software development in PSUs are ideal.

### 1.23 Scope of the study

The study covers a rigorous analysis over the concept of Management Information Systems developed/ deployed and used only in three select public sector organizations in the state of Andhra Pradesh i) viz, Mahatma Gandhi National Rural Employment Guarantee Scheme in Rural Development Department ii) Tribal Welfare Dept iii) Civil Supplies Dept in the state of Andhra Pradesh.

The scope of the study is limited to the PSUs selected and it only studies the utility of the present Management Information Systems to the top bureaucrats, other staff and the beneficiaries who are availing the services offered by the selected PSUs either through common service centers or through internet kiosks in the state of Andhra Pradesh only.

The scope of the study is limited to identification of common requirements of information at different levels and it does not cover any of the technical aspects of MIS development like software programming, software architecture & design and software tools & techniques.
The study to identify and suggest the best leadership approaches, software process and procedures for development of MIS is confined to government organizations and the study of similar type in private organizations is out of the scope of the present research.

1.24 Data sources and Research Methodology

As the study is an explorative and analytical one, the study used both qualitative and quantitative data from primary and secondary sources. Primary data was collected through a structured questionnaire circulated to all the selected PSUs. Separate structured questionnaires were designed for top level government officials, mid level executives, IT Staff and for the beneficiary citizens. The questionnaire consisted of general MIS information, MIS deliverables, use of MIS and evaluation of MIS. Beneficiaries were asked to respond their satisfaction levels on various MIS deliverables and their experiences.

Secondary data has been collected from various sources namely literature of MIS in PSUs, annual reports of PSUs, Govt documents, manuals etc…

The following public sector organizations have been selected for the study.

1. MGNREGS, Rural Development Dept.
2. Civil Supplies Dept.
3. Tribal Welfare Dept.

The study was conducted to know and assess the impact of the existing MIS at the above selected public sector organizations on the Top Govt. officials, mid level executives, IT Staff and to the beneficiaries using a structured questionnaire. The questionnaire has also been distributed to randomly selected beneficiaries of these three
PSUs to assess the impact of the present MIS on the beneficiaries. Fact to face interviews were conduct with the top government bureaucrats, executives and Head of the IT wings to ascertain their opinion on the existing MIS and to know the advantages and problems being faced by them with the present system.

1.25 Period of the study

The literature on the research topic was gathered up to 2013. The secondary data was also collected from the all the PSUs up to 2013. The primary data and surveys for the study were conducted during Nov 2013 to March 2014.

1.26 Selection of Sample

Since three Public Sector Organizations have been taken up for study, responses have been obtained from top management/ Govt. officials, mid level executives, IT Staff and Customers/ beneficiaries from each of the three organizations taken up for the study.

Since MGNREGS, Rural Development Dept, Civil Supplies Dept and Tribal Welfare Dept are pioneers in implementation of IT enabled services in Govt. Sector, they have been selected for the study.

TW Dept is disbursing scholarships online and is also administering all the financial transactions through MIS and in MGNREGS works are being executed in every village and payments are being made to the beneficiaries through the MIS. In Civil supplies department also MIS is being implemented for all the activities of the department.
(Table 1.26)

<table>
<thead>
<tr>
<th>Details of Respondents</th>
<th>MGNREGS</th>
<th></th>
<th>Civil Supplies</th>
<th></th>
<th>Welfare Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Sample size</td>
<td>%</td>
<td>Population</td>
<td>Sample size</td>
</tr>
<tr>
<td>Top Bureaucrats/Officials</td>
<td>74</td>
<td>50</td>
<td>68</td>
<td>62</td>
<td>50</td>
</tr>
<tr>
<td>Mid Level Executives</td>
<td>145</td>
<td>50</td>
<td>34</td>
<td>112</td>
<td>50</td>
</tr>
<tr>
<td>IT Staff</td>
<td>63</td>
<td>50</td>
<td>79</td>
<td>58</td>
<td>50</td>
</tr>
<tr>
<td>Beneficiaries</td>
<td>1540</td>
<td>150</td>
<td>10</td>
<td>790</td>
<td>150</td>
</tr>
<tr>
<td>Total</td>
<td>1822</td>
<td>300</td>
<td>16</td>
<td>1022</td>
<td>300</td>
</tr>
</tbody>
</table>

As seen from the above table, responses have been obtained from 150 top executives/senior government officials. Responses have also been obtained from 150 mid-level executives/administrative staff and 150 IT staff who are either directly or indirectly involved either in MIS development or maintenance. Responses have also been obtained from 450 beneficiaries/citizens who are using the MIS services offered by the selected government organizations.

1.27 Sampling Frame

The research study was conducted in three reputed public sector organizations. The organizations selected have significant experience in developing MIS applications and delivering the services to the citizens online. These organizations have numerous ongoing MIS software development efforts. The organizations represented a typical staff
with distributed teams either inside the department or in the sub unit offices at the district level. This environment provided a depth of information and expertise that produced a rich data set for evaluation.

1.28 Tools of Analysis

The data from the completed research forms was manually entered into a SPSS database for management of data and for analysis. In order to ensure confidentiality the database and all the backups were password protected. The forms were stored in a locked filing cabinet except during data entry sessions. The forms were assigned a random ID number. During the data entry process, data was checked for accuracy and consistency of entry, spot checks were performed and range limitations were established to ensure the integrity of the data. The data from the three parts of the survey were subjected to standardized statistical analysis techniques. The data from each of the sections were summarized and presented in summary tables. Each of the key portions of the five research questions were explored for statistical relationships, correlations, patterns and trends. For example, on items where the data were arranged on continuum, the two answers on either the positive or negative side of the average were combined and analyzed both as an individual response and as a composite measure.

SPSS was used to perform the statistical analysis of the variable for this investigation. The statistical analysis was performed by using factor analysis with Chi-Square. As the worth of the data is often determined by the quality of the instrument and the procedures used during the study, during the research it was endeavored to meet the highest standards of research. Among the steps that were taken to minimize investigator
bias were convening the expert panel, field testing and standardizing the administration procedures. In addition the detailed plan has to be carefully followed, as outlined above in order to develop an instrument that was appropriate for the objectives of the study and that demonstrated strong psychometric properties.

In order to enhance the scientific rigor of the study the research plan and methodology were executed according to the highest standards of research. By adhering to the plan it was possible to capture high quality data and avoid low response rates that might have compromised the integrity of the results. The generally accepted standards and practices for statistical treatment of data were executed during the research study.

1.29 Pilot Study

Since the questionnaire was new, a pilot study was conducted to verify the adequacy of the distribution method, interview questions etc... The pilot study was conducted during the first three weeks. Twenty five individuals associated with MIS in the selected public sector organizations were selected to participate.

The pilot study participants were provided with the questionnaire. Participants were asked to complete the questionnaire as presented. Participants were then asked to provide feedback on the adequacy of the format, interview questions, and suggestions for improvement. Each of the Twenty five individuals completed all interview questions and provided feedback on the served questionnaire.

The primary goal of the pilot study was to determine if the interview questions approximated the intent for the research study. All the participants have answered all the
questions. Review of the responses revealed that no changes were required in the questionnaire.

The secondary goal of the pilot study was to determine the adequacy of the data collection method and procedures. The participants were asked to provide feedback on the adequacy of the method and approach. All the participants stated that the questionnaire was easy to use and reported no problems.

1.30 Assumptions

1st Assumption: The first assumption was that the respondents to the questionnaire will provide honest responses to the questions on MIS. Failure to provide honest responses may influence the study validity and results of the research study.

2nd Assumption: The second assumption was that the respondents to the study have experience in the Dept and have knowledge about the schemes of the dept and have been using the MIS for a considerable period of time.

3rd Assumption: The third assumption was that the respondent who returned the questionnaire was the individual who completed the questionnaire and the observations and perceptions are based on the personal experience of the participant.

1.31 Limitations of the Study

The study scope was limited to three public sector organizations in Andhra Pradesh only and the study results reflect individual perceptions and opinions based on the operations in the localized area, economic impacts, and job stability. The study did
not generalize the results to varying populations or geographic locations. The findings of the study are not generalized to the population but rather are applicable to a particular phenomenon.

The study was also limited by the use of an interview questionnaire to collect participant responses. The interview questionnaire provided data from participants but did not support additional probing questions. The responses provided were the only data available for analysis.

1.32 Chapterization

The study entitled “Management Information Systems in Public Sector Organizations” has been divided into six chapters and is presented as follows:

Chapter – I: Introduction to MIS – Research Methodology

It deals with the concept of Management Information System, important details pertaining to MIS in Public sector organizations and Research Methodology.

Chapter – II: Review of Literature on MIS

This chapter consists of the study of already existing literature on Management Information Systems.

Chapter – III: Conceptual frame work of MIS

This chapter explains the conceptual frame work of MIS in detail. The problems faced by the PSUs in the development of MIS, the context of public sector reforms in India and the issues pertaining to MIS and public sector corruption are elaborated.
Chapter – IV: Overview of the Public sector organizations taken up for study

This chapter discusses about the selected public sector organization taken up for study i.e.MGNREGS, Rural Development Dept, AP Civil Supplies Dept and Welfare Departments and the present state of MIS in these organizations is explained in detail.

Chapter – V: Analysis of the MIS in select Public Sector Organizations

This chapter makes a modest attempt to discuss on the perceptional analysis of MIS in select Public sector organizations on several relevant aspects along with detailed graphs, charts and analysis of tests conducted.

Chapter – VI: Summary of Findings, Suggestions and Conclusion

This chapter presents the summary of findings in terms of conclusions and suggestions.