3.1 **SURVEY OF RELEVANT LITERATURE:**

It is generally recognised that in any organisation the quality of decision making depends to no mean extent on the type of information available and the manner in which it is obtained and utilised. It is the properly organised and analysed information that provides to the decision maker the necessary intelligence as also awareness of the likely impact of an indicated course of action. Information is thus perhaps the most crucial ingredient of the decision making process. It is particularly so in government considering the magnitude, variety and complexity of governmental activities and the wide scatter in which policy decisions affecting the life of the community are implemented.

The complexity of organisation and operation of MIS can be solved by systems approach, in which the relationships between the subsystems of scientific,
technological, socioeconomic and commercial sources of information and the subsystems of information flow for managerial planning and control is recognized. The interrelation of internal systems of information flow amongst themselves and their relation to the external environment should also be recognized.

In order to identify the research gap the researcher conducted a relevant survey of literature. The very purpose of this chapter is to review the literature produced in the past bearing on the theme of the present work so that a picture of the current state of knowledge emerges. This will define the positioning of the present effort and the need for undertaking this study particularly in the Indian context.

For this purpose the researcher has surveyed the bibliography of Doctoral dissertations published by the Association of Indian Universities (AIU), the libraries of Indian Institute of Public Administration, New Delhi, Indian Chambers of Commerce and Industry, New Delhi, Faculty of Management Studies, New Delhi, Ratan Tata Library, New Delhi, Xavier Labour Relations Institute,
Journals of academic and non-academic interests have also been referred to by the researcher.

From the articles published in academic journals of national and international repute, it can be inferred that scanty work has been done in national and international context bearing on management information system. Most of the work done pertains to information system, information modelling and computerized information.

Although decision making has been the core of all managerial activities since a long time past, literature on information system as a part of managerial needs was produced only in considerable volume.

3.1. INTERNATIONAL CONTEXT:

The review is discussed mainly under the various headings namely - Development of MIS, Influence of computers on MIS, MIS(s) influence on the functional areas, the other implications of MIS and MIS in the Indian context.
3.1.1 DEVELOPMENT OF MIS:

The plan of development of MIS should thus be to recognize and organise the information flow by properly inter-linking the existing sources, services and systems; and, streamlining the channels, such that, all the information of importance could flow to the internally established MIS which would further process and store the data for ready retrieval and reference.

At present few organisations can adequately access the business value of management information systems and researches have provided little help\(^1\) Ahituv\(^2\), Hirschheim\(^3\) and Kleijnen\(^4\) were of the opinion that the underlying reason for this inadequacy is the lack of relevant theoretical models.\(^5\) A model of management information system and the stages of its implementation has been developed by Mimic,\(^6\) He was of the opinion that most important item and stages in installation of management information system was the transfer of the problem of designing and realization of the management from the sheer technical aspect to the organisational one. However, the role of information, pattern of communication and most important - the information content has not been highlighted.
Moreover, Bengt\textsuperscript{6} writes that a number of approaches to information modelling has been presented in the decade 1970-80 in which most approaches assumed that the correctness of information model is decided from intuitive considerations. He has suggested and discussed three correctness criteria of information and information model namely consistency, satisfiability and completeness.

Furthermore, Ehrlemark\textsuperscript{7} in 'Design your own Management Information System' presents a set of conceptual tools to help management design control systems that are sensitive to changes and identify the problems and possibilities for action. Here, the stress has been more on the physical structure of the organisation.

A behavioural approach to the specification of information system was given by Leveson, Wasserman and Berry\textsuperscript{8} to indicate a multistep formal method used for information systems design and development. These steps include information analysis, semantic specification, verification of the specification, concrete
implementation and also verification of the implementation. Similarly, Lehtinen and Lyytinen\textsuperscript{9} state that the main issue in information systems development is to specify correctly and unambiguously what an information system should accomplish and they call this information system specification. This stresses on the communication purpose the information system has within an organisation.

In their research publication, Goldkuhl and Lyytinen\textsuperscript{10} writes about a new approach to information systems theory in which information system is regarded as a social and linguistic entity. The approach is based on a theory of communicative action, which studies information and communication from the point of view of social interaction. According to the researcher, social interaction is basically an informal process. But much of the daily interactions is due to the formal process brought about by the organisation design and structure - the structure of reporting relationships which has been overlooked in the study.

Sinkovic\textsuperscript{11} deals with the method in which a relevant amount of information can be transferred in the
guided system and states that it largely depends upon the structure of information system. The value, that is, content of information which forms a major consideration of information to be transferred have been overlooked.

However, Kendall and Kendall\textsuperscript{12} reveals that structured observation of the environment is the only reliable way of obtaining information which are unobtainable through interview and investigation.

From the above review it is evident that most of the authors have not dealt with all the parameters of information system. It is further observed that majority of them have laid more stress on the design, development and implementation of MIS structure - and its associated problems. This in other words emphasises on the structural aspect of MIS. The content of information i.e. the "what" of information and the flow of information i.e. the 'how' of information has been totally ignored. This aspect has been covered by the researcher.
3.1.2 INFLUENCE OF COMPUTERS ON MIS:

Computer based information systems have become increasingly important to contemporary organisations. As Steiner\textsuperscript{13} has stated "Information flows are as important to the life and health of a business as the flow of blood is to the life and health of an individual." High performance information systems can do much to promulgate organisational success.

A great many predictions have been made since the late 1950s concerning the impact of the computer on the structure of corporate organisations and in particular as to whether data processing technology would cause greater centralisation or decentralisation in firms.

Leavitt and Whisler\textsuperscript{14} were pioneers in predicting the way that computers might influence corporation. In 1958 they published an article 'Management in the 1980s' and foresaw that (i) top managers would take on greater innovative planning and other creative functions (ii) programmers and research and development personnel would move upward into the top management group. (iii) large industrial organisations would reverse the trend toward decentralisation and would recentralise.
Leidner and Elam\(^{15}\) described an executive system as a computer based information system, designed to provide senior managers access to information relevant to their management activities. With trends as globilisation an intense competition increasing the importance of fast and accurate decision making the use of these systems by executives may become a particularly important component of their decision making behaviour. Their research examines the effects of EIS on use on aspects of the decision making process. It examines three decision making process variable that have received considerable attention in the recent theory on the impact of advanced information technology use decision making in organisation and are well grounded in the organisational research.

However, Lucus Henry\(^{16}\) in his thesis presents the results of an exploratory study of problem solving by top management in a sample of firms. The purpose of his research was to determine the nature of information needed by top management and the role of computer -based system in supplying it. He classifies problems according
to their nature and explores the information sources used to solve the problems. However, the need of information has not been classified according to the functional areas.

3.1.3 MIS & THE FUNCTIONAL AREAS:

Contingency analysis can be applied to subsystems within organisations or questional areas within subsystems. To the extent subsystems (or functional areas) are similar, they should be designed in a similar way. If subsystems are trying to produce different outputs with different technologies and have different organisational interactions, they should be designed and managed differently.

Kweku Ewusi - Mensah discussed several techniques for analyzing the information requirements of a business organisation and developing an information systems architecture to address their needs they elucidate a formal method for deciding on the composition of the information subsystems. He depicted five criteria as a guide in identifying the subsystem. These criteria are flexibility, changeability,
separability, comprehensibility, integrability and data usage and/or creation.

However, Simat\(^{18}\) has dealt with that part of the information system which is linked to the manufacturing activity. It described various components of such a subsystem, their interactions and relations to other subsystems within the integral information system. But he has ignored the relationship of information system with three other major aspects of an organisation that is finance, marketing and personnel.

Li, McLeod and Rogers\(^{19}\) find a more balanced support for all levels of management available through the marketing information system today. They also discovered an alarming lack of linkage between these systems and the strategic information systems of corporations - to such an extent that they stand at a risk of becoming irrelevant.

Moreover, in a paper published by Borbley\(^{20}\) in Online in 1984, he considers how changes in the information profession will affect approaches to managing the information centre. On the basis of a
review of information revolution in the last generation, he states that managers to be successful in business, need only to excel as information specialists, personnel managers and marketing specialists. In his work, Borbley has ignored the financial dimensions that is the need of financial information like budget.

3.1.4 MIS EXECUTIVES:

A review of articles reveals that MIS executives have had to evolve from technicians to managers with little preparation and few role models. They have had to realize their loyalties and commitment to their organisations rather than to their technology. They have had to focus more on interpersonal and administrative skills and delegate to their staff more and more of the technical activity.

One of the most revealing studies ever made of MIS executives was conducted by Ives and Olson. They observed six MIS executives with major corporations to see how and on what they spent their time. It indicated that MIS executives spend majority of their time interacting with people, 78 percent of their time is
spend on communicating with people in scheduled meetings, unscheduled meetings and phone calls. Their study makes a compelling point: an MIS executive must be good at and enjoy working with people. The same is, however, true for virtually all management positions.

Unfortunately, a research into what motivates MIS professionals by Conger, Zawacki and Oppermann indicates that most MIS professionals significantly prefer developing new technical skills to interacting with people. It has been estimated that 80% of the problems that occur with MIS in organisations are a result of communication breakdown. Considering all of the problems that occur with MIS in organisations, communication breakdowns are unquestionably a contributing factor.

3.2 MANAGEMENT INFORMATION SYSTEM WITH REFERENCE TO INDIA:

In any organisation the quality of decision making depends to no mean extent on the type of information available and the manner in which it is obtained and utilised. It is the properly organised and analysed
information that provides to the decision maker the necessary intelligence as also the necessary awareness of the likely impact of an indicated course of action. Information is thus the most crucial ingredient and some refer to it as a material resource of decision making process. One feels in this way particularly in government where the magnitude, variety and complexity of governmental activities and the wide scatter in which policy decisions affecting the life of the community are implemented. Information is an important aspect for decision making. Therefore, a cursory glance on the information systems prevalent in government organisations and to what extent they aid the policy makers becomes a must.

3.2.1 MIS IN GOVERNMENT:

All organisations in government have some kind of reporting and information systems. They are generally found in the nature of progress reports and statistical returns covering different areas such as budget and finance, establishment, project construction, production, operations, etc. In government, reports and returns from attached and subordinate organisations are
obtained not only to meet organisational needs of the controlling ministry but also to fulfil statutory requirements of other concerned agencies. Some of the reports and returns are merely for statistical compilations. The volume and pattern of reports and returns usually evolve over the years without any systematic attempt being made to examine their usefulness.

Studies conducted in certain typical ministeries of the Government of India have revealed that the existing reporting systems suffer from a number of common but serious weaknesses. It is interesting to note that inadequacy of information is not among these weaknesses. On the other hand, overabundance of data obtained through numerous, often overlapping, reports appear to be more or less a common feature. Many of the reports are not put to effective use, or any use at all. At the same time significant gaps are many a time uncovered. In other words, while many of the reports contain data which are of little value for functions like planning, policy formulation, monitoring and
control, different hierarchial levels may yet be handicapped by lack of information relevant to the exercise of such function. This is the outcome of:

1. Accretion of reports and return prescribed to meet adhoc situations but not discontinued thereafter.
2. Non-appraisal of the actual needs of the receiving functionaries.
3. Weaknesses in planning and other procedures.

Other drawbacks noteworthy of mention are:

(i) Overlapping or repetitive reports.
(ii) Voluminous reports containing a mass of irrelevant detail crowding out or obscuring information of significance.
(iii) Narrative reports lacking in focus or selectivity.
(iv) Abnormally long time-gaps - sometimes running into weeks or even months - in the submission of the reports.

For instance, it was observed that in an organisation the extent of
redundancy was found to be as high as 68%. This overload of information is usually not supported by adequate arrangements for its processing, analysis and utilisation so that it is apt to remain a rich collection of data rather than organised information capable of being utilised as a management tool.

(v) Incoming reports and those prepared within the department are in most cases handled on files and recorded in such a manner that an overall picture cannot be had and subsequent retrieval becomes difficult. Consequently it is not uncommon to find references being made to subordinate authority to elicit information that is already available on files.

Therefore, to put in a few words, traditional reporting arrangements in government departments tend to
suffer from both excess and deficiency of information and fall far short of providing a proper information system. Therefore their roll in aiding the process of policy making, and monitoring and control, is thus limited.

3.2.2 DEVELOPMENT OF MIS IN GOVERNMENT:

Fortunately, there is an increasing awareness in higher echelons of government that the traditional approach to information handling is not compatible with the need of the day. In an environment of efficient planning, policy making and control, the role of properly devised management information system in the exercise of these functions is approved of. Therefore, a lot of efforts have accordingly being made during the last decade towards designing and introducing an improved management information system in government organisations.

FOR INSTANCE:

(i) In 1968, a simple but effective MIS was developed for the department of Iron and Steel.
(ii) In 1974, P&T department developed a comprehensive MIS for their telecom operations. Computer based information systems have been installed in the offices of the Director General, Supplies and Disposal, and Director General, Technical Development.

(iii) In 1972, Planning Commissions set up a Monitoring & Information Division with the object, inter alia, of developing an effective information system for watching progress of plans, schemes and projects. The division is now capable of presenting monitored information concerning key sectors, every quarter, to enable review by government at the highest level.

(iv) In 1975, an MIS was developed by the Bureau of Public Enterprises, for comprehensive reporting by public sector units to their administrative ministeries.

The National Informatic Centre of the Department of Electronics has
arrangements to assist government departments in developing suitable MIS. A number of training courses and seminars covering the subject have been organised for middle and senior level executives under the auspices of the Indian Institute of Public Administration, The Training Division of the Department of Personnel and Administrative reforms of the Planning Commission and so on.

(v) In 1976, a high power Advisory Committee on Management Accountancy in Government was set up under the chairmanship of the Ministry of Finance. Among its most important terms of references was the development of suitable MIS in government departments. For this purpose, the three typical ministries viz. Chemicals & Fertilizers, Works and Housing, and Agriculture - one working mainly though the public sector, another executing projects departmentally, and the third depending on the state government agencies
for the implementation of its programmes.

(vi) In 1978, a comprehensive MIS was developed for the Department of Chemicals and Fertilizers and successfully implemented. It is reported to have had a marked impact on decision making and control in the sector administered by the department. Certain other production-oriented ministeries have been asked to develop their own MIS using the Chemicals & Fertilizers model. As such, the Ministry of Transport and Shipping has already developed and installed a suitable MIS for their Ports Wing. The Department of Coal has also finalised a system similar to that operating in the Department of Chemicals & Fertilizers.

(vii) In 1978, an integrated and PERT-based MIS for the Ministry of Works & Housing (CPWD portion) was developed by the Sub Groups and given trial run in a Zonal Chief Engineer's charge. Steps have been initiated for its extension to other ministeries responsible
for executing civil works projects on the CPWD pattern.

As regards the Ministry of Agriculture, MIS has been developed for the massive Command Area Developed Programme, and this is expected to serve as the prototype for similar systems for other area development schemes. A notable feature of the system is its multi-tier approach. A complete system has been developed for the Ministry at the Government of India level, including the 'inputs' to be provided by the various project authorities. This MIS design is expected, with minor modifications, to meet all the information needs of the State Government. In addition, detailed guidelines have been given for the development and installation of improved MIS, including its sub-systems, in the C.A.D. projects in a reasonable time-frame.

The efforts outlined above are in a sense evolutionary and reflect the growing awareness of the need for developing scientific MIS in government departments as an active and to higher management.
There are indications that such effects will be intensified and extended to cover wider areas of governmental activity. This means that more policy makers will have the capability of basing their decisions on relevant, properly analysed and shifted information presented to them in a systematised manner, rather than on haphazard collection of data, piecemeal information and intuitive judgement or personal perception.

3.3 INDIAN CONTEXT:

Work in the Indian context has been reviewed by the researcher and categorised in different heads as - information and its use in organisation, impact of information technology and computerization, design of an information system and finally information in a liberalised economy and its future.

3.3.1 INFORMATION AND ITS USE IN ORGANISATION:

Patel\textsuperscript{23} in his article ‘Planning with Management Information System; discusses the role management information system plays in strategic planning. He has laid stress on long term planning. He has not thrown
any light on its role in the various functional areas of management.

Dr Jawahar Lal\textsuperscript{24} presents opinions of individual investors on different sources of information used by them for investment decisions. He does not mention anything about the institutional investors or the managers in the corporate world who are making a more effective use of such information.

Dr Singla\textsuperscript{25} has revealed the perceptions of individual executives regarding the effectiveness of information system in public sector enterprises in India which varies with the growth stage in the MIS function. This study was behaviour oriented and not technique oriented.

Brig Sundaram\textsuperscript{26} contends that talking about a "Corporate Niche for Information" is not enough. Quite often only lip-service is paid to the concept of information as a corporate resource which is the prime source of failure of growth of computer based information system (CBIS). If IT growth has to be nurtured, he expresses that special attention has to be
given to training till IT culture reaches levels for sustained corporate training. The approach has been too general; no specific aspects of IT were considered.

Desai and Bhaskar\textsuperscript{27} in their publication express the view that the survival of banking industry is vitally dependent on the effective use of information technology because the banking industry has become unwieldy due to the scale of its own success, the magnitude of growth and the increasing complexity of its operations.

3.3.2 IMPACT OF INFORMATION TECHNOLOGY AND COMPUTERIZATION:

Goyal\textsuperscript{28} in his publication examines how the EDP department could be geared for the 1990s. It should be so placed in the organisation that it plays a two fold role - the first is that it forms a synergistic partnership with other departments of the organisation and the other it helps management to respond and adapt positively to a rapidly-changing environment.

Emerging issues of high technology vis-a-vis management accountant, has been taken up by Nigam.\textsuperscript{29}
According to him introducing high technology is regarded as one of the most effective ways of affecting organisational changes within the firm. Light is thrown on the responsibility of the management accountant in introducing high technology.

In the article entitled 'Some Organisational Ramification of Computerization', Deepti Bhatnagar attempts to articulate the likely impact information technology has on some important organisation variables such as organisational structure, management systems, staff, skill level and management styles.

In his publication, Krishan Kalra, examines the technological changes and innovations brought about primarily by the electronics and communications breakthrough; gets an understanding of the socio-economic needs and pressures in order to explore the prospects of an organisation's survival and prosperity.

In the article 'Decision Hierarchy and Computer Usage', Banerjee provides an overview of computer usage at various decision-making levels for a process.
industry like IISCO and an engineering industry like BHEL. He further states that if the needs of applications area are analysed in detail and according to their priority, then the computer technology will have the conceptual and technological ability to satisfy all the major requirements of any process of an engineering industry.

Sachdeva\textsuperscript{33} presents a computerised Financial Information System that has been designed, developed and implemented by the government of Gujarat in consultation with the Indian Institute of Public Administration to help the State Government in the monitoring and control of the state budget and in evaluating alternative budget proposals.

Sen Gupta\textsuperscript{34} has elaborated on the extensive use of a computer in management of material in an organisation thus enabling a materials manager to engage in more creative pursuits than the daily routine work. Light has also been thrown on the doubts, distrust and reservations associated with the use of a computer.
Rajendra Prasad\textsuperscript{35} in his published paper attempts to describe the various stages in computerization projects and the activities which follow.

In a published paper in Indian Management, Khanna\textsuperscript{36} expresses that information technology must do more than merely automate existing procedures and processes and initiative at the highest levels of organisations should ensure that IT serves as a powerful tool for decision making at all levels of management. For this, he advocates the tying of IT strategy with the business strategy.

3.3.3 DESIGN OF INFORMATION SYSTEM:

Panda\textsuperscript{37} states that information system is contingent upon the nature of organisation to which it belongs and the structure. He expresses that there exists three types of information system in an organisation - they being pure market, bureaucracy & elan to support decision making. Information system with the capabilities of filtration and condensation of information improve the effectiveness of decisions, eliminate information overload and make the decision -
making process simpler. Organisation process performance is the manifestation of the effective decisions. So, proper selection and design of information systems is critical to the performance of modern organisations.

Sethi stresses the need to adopt a control system and also define the general purpose of a control tool. The purpose of control tools or control systems are defined as the mechanism used to collect and organise data, feed it back to the decision maker and facilitate comparison with predetermined standards. One of the ten tools mentioned by him is MIS. In this context, he suggests the creation of a real-time system, which he defines as a system where data is processed at such speed that output may be fed back to control current operations. In such a system information is updated frequently enough to be correct at all times and information can be retrieved as quickly as needed.

Viera opines that it may not be widely known but in many situations it is the top management in a company which is the biggest stumbling block to a desirable
change. This proposition is based on a study of a few companies. According to him their moves are a reflection of insecurity in the face of changing technology -like they seek perfection in other unimportant and routine matters like preparation of reports.

3.3.4 INFORMATION IN THE PRESENT AND FUTURE SCENARIO:

Singh and Upendra in one of their publications in 'Indian Management' have outlined a framework for an information infrastructure to enable organisations to operate successfully in a liberalised economy. The proposed structure envisaged creation of information base at four levels-namely individual organisation, related business group, segment of an industry and industry level. At the industry level, it has been suggested to create data base containing information about external environment only.

The leader of the British Alvey project on fifth generation computers, Brian Oakley in his article 'IT, Existing and Future Possibilities' discusses the available and future possibilities of information
technology. He further states that in the future the societies that can take the maximum advantage of the ever-widening applications of computers would be the ones to dominate the world.

3.4 REVIEW OF TEXTS:

Various books or texts on Information System has been referred to by the researcher. Some have emphasised on information as a useful resource. Kanter\textsuperscript{42} treats information as valuable a resource as the more traditional ones of money, material, people and facilities and hence should be managed as such. Also he lays emphasis on the management process as opposed to the product.

Clifton\textsuperscript{43} takes into account the close relationship between the users of information and its preparation as evidenced by their great employment of personal computers, office automation and data communications.

Voich, Mottice and Shrode\textsuperscript{44} present the basic concepts for the effective management of the information function in an organisation. They view information both
as a process of transforming data into information and as a facilitator for the performance of the basic functions of management process.

In their book, Sprague and McNurlin trace the growing importance of information systems management and presents a conceptual model to indicate the key areas and the manner in which they fit together. They have also laid down the principal issues for the executives in each area.

Olson views information system as a support system for an organisation. It stresses on standard operational information systems, information systems for management control, information systems for strategic management, decision support system, office information system and knowledge work support system.

Condon discusses the more effective utilisation of data processing equipment and teaches the use of various tools employed by the system analyst in the creation of better systems. It deals with the nature of the systems development cycle and use of its tools in each phase of the cycle.
Ross, Murdick and Clagget\textsuperscript{48} explores MIS development from the managers or users' perspective and deals extensively with the practice of planning, designing, implementing and control of MIS. However, the value of information and the content which helps in taking decision has not been emphasised.

Stenitz\textsuperscript{49} observes that in the present times technology makes it possible to have information cheaply, quickly and accurately and at a much less cost as compared to a decade or two ago. He emphasises that yet the right skills are essential for the pay off to be dramatic. Hence, it is important to recognize the necessary skills. Further, management costs which refer to staff costs, space costs, computer costs and communication costs in terms of financial sector are directly related to management information system.

Bhatnagar and Ramani\textsuperscript{50} provide an insight into computers and their use in organisations. It views MIS as essentially a man-machine system. Further, presented problems pertinent to the successful use of information technology in organisation is presented through a case study on computerization.
Ken Eason\textsuperscript{51} says that as information technology has advanced, the methodologies and tools for technical systems design have become progressively more sophisticated and efficient. By contrast the techniques by which users can specify their needs, evaluate alternatives, implement systems, make complementary organisational changes, hardly progressed at all. There is a need of socio technical system design; the joint decision of the technical and social sub-systems in the organisation. He illustrates a set of methods and tools to manage this as a socio-technical design process.

Dickson and Wetherbe\textsuperscript{52} present a systematic and comprehensive treatment of MIS management. It provides a managerial organisational, behavioural and technical treatment of MIS management.

Riley\textsuperscript{53} has integrated the basic systems theory with the design, implementation, and application of management information systems to facilitate the understanding of MIS goals and the effect of MIS on organisational structure and corporate management. It also provides an insight into how organisational
structure and management can affect MIS. He has made available a supplemental source of materials on the managerial complexity of MIS in the corporate environment.

A collection of papers, articles and extracts on the prime requisites of effective management information system for the corporate organisations have been presented by Singh and Bhattacharya. It represents concepts, ideas, experiences and applications which together cover the dynamics of the modern management information system.
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