ABSTRACT

Management Information Systems have changed dramatically during the last 20 years as a result of an increased usage of computers by more and more number of organisations. The situation today is significantly different from that of a decade ago.

Management information system plays an important role in decision making for effective and efficient implementation and accomplishment of the objectives of the organisation. Management information system as a matter of fact, is a formal entity composed of a variety of logical and physical resources. From organisation to organisation, these resources are arranged or structured in an infinite number of ways to provide the managers with the package of information relevant to their decision-making needs. It is, therefore, closely related with the objectives, policies and strategies of organisation established by management. It bears a tremendous amount of impact on the utilization of physical, human and financial resources of a productive system of an organisation. Management Information System is thus a combination of people, machines and procedures organized to provide past, present and prospective information relating to internal operations and external intelligence. It supports the planning, control and operational function of an organisation by furnishing uniform information in the proper time-frame to assist the decision-making process.

The role of Management Information System, henceforth MIS can be studied in a group of industries. On the one hand its role on any one functional area of a group of industries can be
sought to be formulated or on the other one can seek to trace its role in all functional areas with reference to a particular industry. However, the scope of the present research work encompasses a much wider spectrum. A number of researches have been done in India on various aspects of MIS, such as, significance, utility, applicability of MIS organisation and their role in decision making in different functional areas but hardly any work has been traced and witnessed with special reference to the role of MIS in sales promotion. Hence, the present study is hence a novel attempt to assess the role of MIS in sales promotion. A case study of Maruti Udyog Limited (MUL), a joint venture between India and Suzuki Motors of Japan, has been threadbase presented.

The study has been pursued to seek the following objectives:

The concept of management information system (MIS) has been extensively reviewed to frame up the design of the study.

The growth and development of automobile industry in India has been studied in detailed perspective to examine as to how the public sector as well as the private sector have been faring since time immemorial and during the planned period. The MUL has been studied with special focus.

The practices and applicability of Management Information System in Maruti Udyog Limited (MUL) have been critically examined and analysed with the help of the questionnaire comprising respondents of different status in MUL management strata.

The role of sales promotion techniques in promoting sales volume has been evaluated.
And finally the problems of MIS have been identified to suggest suitable measures for effective and efficient MIS in MUL to compete with the emerging automobile giants in the country.

The background of automobile is associated with the invention of wheel. French Army Captain Nicholas Cygnot was the inventor of the first self propelled 'Land Vehicle' in the year 1769. After this, Oliver Evans of Philadelphia produced a mobile steam drege in 1805. In 1908, Henry Fonda introduced a motorised vehicle. An assembly line system was introduced for mass production in United States, the same pattern was followed by Britain in 1911. By 1920's, automobile industry became an important industry of the western countries. Since the First World War (1912-17) lot of vehicles and motor cars were imported mainly from European countries. These included large numbers of commercial vehicles which were imported during 1898-1940. The red letter day for India came when General Motors India Ltd was set up in 1928 in Mumbai chiefly for the purpose of assembling trucks and cars from components. In 1930-31, the Ford Motors Company of India Ltd established its amalgamate units in Mumbai, Calcutta and Chennai. In 1942, the Hindustan Motors Ltd was setup in Baroda with an authorised capital of Rs 20 crores in collaboration with the British Motors Corporation. On 2nd of October, 1982 the Government of India and M/s Suzuki Motor Co of Japan entered into an agreement to give momentum to automobile industry in India.

The origin of the Indian auto component industry dates back to 1953, when the Indian Government decided to develop its own manufacturing base with principal intention of import substitution. There are over 350 major players in the auto component sector. Most of them are evenly distributed in the
north, south and western parts of India.

The total production of automobile in India was in 1970-71 235539 as against 4206533 in 1996-97 recording an increase of 1685.91 per cent in 1996-97. The production of automobile has been increasing over the decades in India.

Thirteen units have been licensed to manufacture light, medium and heavy duty commercial vehicles with total licensed capacity of 31300 numbers per annum. Commercial vehicles are of payload of less than 1 tonne to 18 tonnes. The commercial vehicles broadly fall under two categories medium and heavy commercial vehicles (M & HCV), in the payload 8 tonnes and light commercial vehicles, in the payload 3.6 tonnes segment. There are two major producers for heavy commercial vehicles dominated by Telco (76 per cent market share) and Ashok leyland (24 per cent). The major players in LCVs are Telco, Ashok leyland, Bajaj Tempo, Mahindra & Mahindra, Eicher Motors and Swaraj Mazda.

In 1950-51 the production of medium and heavy vehicles was 764 which rose to 155696 in 1996 showing an overall rise of 2028.05 per cent. The production of light commercial vehicles has increased from 11683 in 1950 to 147321 in 1996 indicating an overall rise of 1.160 per cent. In the forthcoming century, there is a note of optimism that the demand for commercial vehicles will continue to grow.

The first passenger car plant of India, came up through Hindustan Motors Ltd. on the outskirts of Calcutta in the early 1940s and in the next few years two more plants viz. Premier Automobile Ltd. and Standard Motors Ltd. were set-up at Bombay (Mumbai) and Madras (Chennai). The idea of manufacturing peoples car (small and low price) was first developed in early
1960s but, this project was not given serious consideration till the 1970s. There are five major units manufacturing cars in India. These are, Hindustan Motors, Premier Automobile, Standard Motors, Maruti Udyog and Sipani Automobile. The production of passenger cars has been increasing over the decades in India. The total production has increased from 9297 in 1950 to 347800 in 1995, a whopping rise of 3653 per cent over 1950 with an average growth rate of 31.638 per cent. The passenger car industry in India has changed dramatically in the last five years, thanks to the liberalisation of the economy.

Presently there are two major units producing jeeps in India, viz. Mahindra & Mahindra Ltd. and Maruti Udyog Ltd. The total production of jeeps which was 11010 during 1976 increased to 37369 in 1990-91 recording a rise of 339 per cent. India is likely to become the main source of supply for hi-tech environment-friendly car air-conditioners for the world automobile market by 2000.

The first two-wheeler in the country was produced in 1955 by the Royal Enfield Motors Ltd. Two wheelers consist of three ranges, scooters, motor cycles and mopeds. There are three leading manufacturers of scooters - Bajaj Auto Ltd., Lohia Machines Ltd., and Mahindra & Mahindra Ltd. Delhi is the largest market for scooters followed by Maharashtra, Punjab and Haryana. The major producers of mopeds in the country are TV Suzuki Ltd. and Kinetic Engineering Ltd. Besides these, there are 1820 other units manufacturing mopeds in the country. The production of two-wheeler has increased manifolds so much so to 3078985 vehicles in 1997 against 952 vehicles in 1955, an increase of 323322.79 per cent over the year 1955 with an average growth rate of 45.70 per cent per annum.
There are three leading manufacturing three-wheelers i.e. Bajaj Auto Ltd, Automobile Products of India Ltd, and Scooters India Ltd. Of them, Bajaj Auto has a near monopoly share of 96 per cent. The total production of three-wheelers was 208,494 during 1996-97 which was more than 69,497,000 per cent compared to production of 1950. By 1992-93, the export of automobile in India was 73,886, an increase up to 200,370 units in 1996-97 by 171.18 per cent over previous years. During the period of the study, it has been found that the highest export pertains to motorcycles and mopeds in India.

The advent of Maruti Udyog Ltd revolutionised the passenger car market in India in 1983. Its history synchronises with the advent of fuel efficient vehicle scheme of the Government of India. In order to give an impetus to the modern technology, in the manufacturing of cars, an agreement was signed by the Government of India and the Suzuki Motor Corporation of Japan in 1982 for a joint product. Therefore, in November 1983, its production commenced with the launching of Maruti 800CC from its factory at Gurgaon.

The mission of the Company is "to provide a wide range of modern, high quality fuel efficient vehicles in order to meet the need of different customers, both in domestic and export market." The objective of the Government of India in allowing the MUL was to innovate and modernise the automobile industry to produce a modern car at an affordable price with fuel efficiency.

The MUL was converted into a non-government company in 1992. Maruti's total equity at present stands at Rs 1322.92 million. A licence and a joint venture agreement was originally signed with Suzuki Motor Company of Japan in October 1982 by which Suzuki acquired 26 per cent share of equity, with an option
to increase it to 40 per cent. Suzuki exercised this option in 1987 by increasing its equity to 40 per cent. In 1992, Suzuki Motor Corporation further increased its equity to 50 per cent. In the last 14 years, Maruti has introduced some 15 models which include Maruti 800, Omni, Gypsy, Maruti 800 new model, Maruti 1000, Zen, Esteem, Gypsy King etc.

The Board of Directors of MUL is the top administrative organ as well as the supreme policy making body of the company. Directors in MUL are appointed by the promoters and their names are mentioned in the articles of the association. The size of the board of MUL has been changing with the passage of time and need. The chairman of the board is appointed by the Government of India who also acts as part time director of the company.

In 1988 there were four full time directors who are representative directors of the SMC incharge of production, material, technical, finance etc. The managing director is chief executive of the company, who is also supreme authority. He is assisted by the above mentioned four directors who in turn, are assisted by thirteen divisional heads directly or indirectly in routine matters. The managing director is having all powers authorised by board and is responsible for all such important policy matters such as production, marketing, sales, quality control, vendor upgradation, employee's welfare schemes etc. There are thirteen main divisions, five of which are reporting directly to the managing director while the rest eight divisional heads report to their respective directors.

The number of directors has been increased to five in 1992 from four in 1988. The director (M&S) has been assigned two departments i.e. marketing and sales and spares. Instead of director (technical) as in 1988, there is director (engg.) who is
entrusted with the divisions of QAs service. There is almost no charge in the director (P&P). In case of director (material), the division vendor development, which was previously independent has been attached to it besides the existing divisions. The noticeable change in the organisational structure of MUL in 1994 is the creation of two joint managing directors in place of directors projects, production and materials from 11 to 13. In 1995, it is observed that there is noticeable change as a new director, entrusted with marketing activities has been created. Other layers of directors are the same.

The MUL has a well knit and a well designed personnel policy, starting from the recruitment policy, promotional avenues, training schedule, manpower metamorphosis, performance evaluation, personnel working conditions, amenities and other benefits of welfare orientation. In MUL, new training is essential because of fast development of new technological changes in industries with the passage of time and is based on Japanese technology. MUL organises several developmental training programmes by organising lectures on them. It adopts principles to open promotional avenues, tries to promote on the basis of merit, punctuality, efficiency and behaviour.

Resume of Findings of the Survey

MUL's sales performance over the years has registered an impressive growth trends. The sale increased to 3272.66 in 1997-98 as against 22048 in 1984-85.

MUL has developed an extensive marketing and after sale service network comprising 123 dealers, 161 sales outlets (covering 93 cities) 194 dealer workshops and 868 Maruti authorised service stations. This speaks volumes of excellent after sale service facilities.
The export of Maruti vehicles has increased manifold during the year under reference. Maruti has exported over 16 lakh vehicles to more than 100 countries till October 1997. Seventy five per cent of these vehicles have been sent to European countries.

However, MUL has failed to attain its own role projections to produce a small family's car due to a number of constraints. There is an entry of new dealers like Daewoo, Telco, Matiz, Honda, Toyota and Tata's.

During the year under reference Maruti has increased its service network to bring quality service within easy reach of the customers. The number of approved service workshops increased from 856 to 1010 covering 142 cities in the country. Besides, Maruti is now trying to bring in diesel vehicles and also new models like, Vitara Wagon R and Balleno.

The company has implemented an enterprise wide E-Mail system with the help of this system. The Maruti personnel now can communicate with all other employees of the organisation as well as dealers, vendors and any person anywhere in the world with an Internet E-mail address.

The role of MIS in MUL at different branches, specially in ten cities of India under reference is increasing.

Majority of the managers of MUL in almost all the units under review have laid considerable emphasis on vital contribution of MIS towards effective, valuable, fast, accurate and reliable decision with regard to production and sales.

The existence of MIS division at the branch of Agra, one MIS division is available at each level i.e. Head office level, regional level and branch level. The other branches of MUL which
have separate MIS division at all the three levels are in Mumbai, Delhi, Ghaziabad and Moradabad.

In Agra branch of MUL, there are two nomenclatures i.e. MIS division and EDP section. In Aligarh, 3 nomenclatures, MIS, EDP and computer division. In Mumbai 2, EDP and computer. Delhi all the three, Ghaziabad two, and other nomenclature two in Gurgaon and Moradabad one each.

The number of MIS equipments being used at MUL branches in the cities such as Mumbai, Delhi, Jaipur, Mysore and Moradabad, LAN equipment is commonly used. FAX is another common equipment used in the MUL branches of Agra, Aligarh, Mumbai, Ghaziabad, Gurgaon, Jaipur, Mysore, and Moradabad. Internet is used in four cities of Aligarh, Mumbai, Delhi and Jaipur. E-mail is being used at all the branch offices in the cities under review.

The sizes of computers, e.g. mini computer, micro computer, super mini computer and mainframe are being used at six branches of MUL in all the ten cities under survey. The mini computer in operation at one MUL branch i.e. at Gurgaon, micro computer at two branches one each at Agra and Ghaziabad.

In the area of choice of preference of passenger cars of Maruti vehicles in the market, Maruti 800 ranked first in under survey cities of India. Zen falls in second rank having all cities in second position and the third place goes to Omni followed by Esteem VI and LX in fourth and fifth position.

The number of employees working in MIS division at different branches, Gurgaon has the highest number of employees (130) at three levels of the MIS division i.e. top level 5, middle level 50, and lower level 75. Delhi occupies the second
rank with 47 employees followed by Mumbai 47, Jaipur 40, Pune 37, Moradabad 26, Ghaziabad 25, Agra 22, Mysore 20, and Aligarh 16.

Manual and key driven techniques are also found to be commonly used by the MUL branches in functional areas. Punch card technique is only available at Moradabad branch of MUL. Agra, Aligarh, Ghaziabad and Mysore branches have tactical MIS whereas Delhi and Gurgaon are having all three types of MIS i.e., strategic, tactical and operational.

The MIS at MUL branches are suffering from malfunctions, excess information, files and failure of power. Majority of the branches of MUL are facing the hazard of either mal-function or failure of power and communication. Even then the respondents of MUL in all the branches under survey were found to be hundred per cent satisfied with the overall performance of MIS.

The objective of sales promotion techniques adopted by Maruti Udyog Limited is to add value to a product or add to the perceived value of the product. Sampling, coupons, cash refund offer, price-off promotion, cash payment through premium, free trial, demonstration contest, advertising specialities, buying allowance are the strategies.

The sales promotion technique 'free trial' (100%) has been very effective adopted by all the dealers under survey, followed by 'offer prizes' (90%), advertising specialities 80%, warrantees 6%, demonstration 6%, coupons 50%. The other techniques such as, samples, price off, cash payment through premium, buying allowances, were not effective.

To introduce new products (100%) has been one of the important purposes of sales promotion technique following other
purposes such as to attract new customers (90%), to counter attack the competitors (60%), to simplify the task of selling (50%) etc. All the ten cities under survey, electronic media advertising has been very effective in selling new models of Maruti cars without hurting the existing models.

The press advertising of MUL has been one of the most important promotional tools for selling new models of Maruti cars in the market without hurting the models.

It was found that environmental factors have been very effective and influential in determining the growth of sales of Maruti cars in all the ten cities of India selected for survey.

Among environmental factors, economic environment has been one of the important factors that influenced the sales of Maruti cars in India. It was found that frequent technological changes in the automobile industry could not beat down the MUL. It could compete well in the market where technological changes are frequent.

Maruti 800 and Zen have attracted buyers in every city under survey. Similarly Omni Van has attracted the buyers in each city except Mumbai and Delhi. Maruti 1000 was in demand in Mumbai, Delhi, Mysore, Moradabad, and Pune.

The contribution of sales volume of different types of Maruti car models was found that Maruti 800 (100%), Omni (100%) and Zen (100%) have contributed largely to sales volume in all the cities under survey. The other model Maruti 1000 (80%) has also contributed largely to sales volume in each city under survey.

The main competitors of Maruti vehicles in Agra were Santro, Honda city, Matiz, Mahindra and Safari. In Aligarh Santro Matiz, Daewoo, and Tata Indica likewise in Mumbai Santro, Honda city,
Matiz, Mahindra and Daewoo. In Delhi the situation is different, Honda city, Matiz, Daewoo and Fords cars are the competitors.

Regarding the main competitors of Maruti cars in terms of design, quality, fuel efficiency and prices, it was found that in term of quality Honda was on the top followed by Daewoo and Tata. In fuel efficiency, Matiz was on the top followed by Honda. In terms of price, Matiz was the main competitor of Maruti Udyog followed by Honda, Santro, Daewoo etc.

Regarding nationality of consumers in different cities it was found that out of 50 consumers 44 were Indians and 6 were NRI's. The occupation of consumers shows that out of 50 respondents 24 were in business, 14 in government service, other 12 in private services.

In the five important industrial cities under survey the majority of the respondents have the Maruti vehicles falling under the income group of Rs 5000 to 10000. In this group the total number of respondents were 23 of which six each belong to Pune and Mysore followed by Delhi five, Mumbai two and Aligarh four.

In the area of educational qualification of consumers of Maruti, the total number of respondents were 50, out of which 18 respondents were graduates, 10 of them engineers followed by 8 Ph D, 7 postgraduate, 4 SSSC and 3 diploma holders.

As regards the terms and conditions regarding purchasing of the vehicles, it has been found that 32 respondents have purchased their vehicles by own money followed by bank loan (8) and instalments system (7). About 64 percent of the respondents have bought the vehicles by their own money. 9 were from Delhi followed by Aligarh (8), Pune (6), Mysore (5) and Mumbai (4).
Regarding the factors having influenced the respondents for purchasing the Maruti car it has been found that out of the total 50 respondents of five cities under survey, 16 of them i.e. 32% have been found to be influenced by the factor of self esteem, of 16, 5 respondents belong to Aligarh, 6 Mysore, 2 each from Mumbai and Pune and one from Delhi.

About reasons for purchasing the car, it has been found that the highest 18 respondents were of the view that they purchased the car because it is most comfortable, 17 say it was easy to purchase, 16 were of the view that it is of high quality another 16 are of the opinion that it is of low price.

Under the survey the total 50 respondents have shown satisfaction with the quality of 'starting' and 'pick up','alignment', 'brakes', and 'engine' 40 respondents have expressed satisfaction with fuel consumption, headlight, balances, clutch, shocker, fuel filter, air filter etc. During warranty period 30 dealers attitude towards consumers was positive, 20 have reported satisfactory. On the contrary after the warranty period the attitude of dealer has been found different as only, 23 respondents have reported satisfactory 14 positive and 13 satisfactory. In post warranty period, the situation with regard to the response of the dealers is just contrary, as majority of the respondents complained about indifferent behaviour of the dealers in addressing their problems with regard to the Maruti four wheelers.

The survey has revealed that the action taken by the company on the complaint of the respondents has not been properly attended to. More than 95% respondents have been found to be totally dissatisfied with inordinate delay in taking action of any sort. With regard to the authenticity of authorized dealers dealing in genuine spare parts, the survey reveals that 55% respondents have
confirmed that most of the time they get the genuine spare parts. However, 24% still face the problem in getting the genuine spare parts for their vehicles. In smaller cities such as Aligarh, Mysore and Pune, the availability of genuine parts is lesser than other cities under reference. Regarding the value of the car, about 46% of the respondents under survey have felt that the Maruti vehicles are economical, 38% observe that this particular vehicle presents the best specimen for utility purpose. However, paltry 16% were of the view that this particular vehicle is meant for luxury.

In a nutshell, the overall efficiency of MIS in MUL is an indication of automobile paragon for other automobiles to emulate to stay in competition for future revival and survival.

**Suggestions and Recommendations**

The MIS is too complex to be handled by technical people alone. Manager in MUL should take initiative to identify strategic areas of information needs and should target at increasing efficiency and effectiveness of organisation.

All the functional information systems of Maruti are closely associated with each other. They cannot operate in isolation. So, while designing the management information systems, the integration of all these systems should be a major point of consideration. There should be a sequential process of problem analysis, design, coding, testing and implementation.

The input design of MIS in MUL should lay special emphasis on input validation and codification scheme. Proper procedures should be laid down and documented. The output design of MIS in Maruti Udyog should be given special attention. Proper output design specifications should be specified so that the programmer can understand the exact form of output requirements.
To increase the employees understanding about their jobs and job responsibilities in MUL, personnel policies should be effectively commanded to avoid confusion and duplication of individual and group efforts.

A sound wage structure based upon sound and fair incentive plans coupled with bonus earnings is conducive for high morale and motivation of employees which ultimately leads to greater productivity.

The executives in the organisation in MUL should sit together with the workers, discuss and exchange views on the burning problems of the organisation and the industry. They should listen to the grievances and complaints of the workers. Regular meetings may be arranged with the workers to invite or give suggestions on the problems generally faced by the employees at their work and guide them wherever required. This will develop a sense of togetherness and increase morale.

The management should maintain a sound communication system with the employees so that any information concerning them may be passed on to them. Some progressive managements publish regular bulletins containing the latest news, views and developments about the working and the workers of the organisation and circulate them among the employees. It satisfies their ego and helps maintaining high morale.

Information system resources to be managed to meet the requirements of today, must be developed to meet the needs of future.

Marketing management information system in MUL requires an understanding of full implications of basic constituent terms marketing, management, information, and system as well as of
some meaningful compound terms such as information systems. Therefore, marketing managers should understand the objective of a true MMIS and how it supports the management for effective decision-making. So marketers must be aware of their need to know about things that are happening in the world outside their organisation.

One most important principle is that the MMIS in MUL should provide the manager with the relevant information that he needs to perform his job effectively. Another principle is that the system must satisfy the perceived informational needs of its user-managers. Any system that does not meet these needs will not be used, at least for the purpose and in the manner that was intended.

Maruti Udyog must use different varieties of the intelligent MIS by the nature of their model building capacity as under: a) Database model building, b) predictive model building c) Optimization model building and d) action model model building.

Organisational structure must use two main techniques in MUL which are as under

i) Organisation analysis. This is the process of defining the objectives and activities of a firm in the light of an examination of its external environment and internal circumstances

ii) Organisation design. The information provided by the organization analysis is used to define the structure of the organization, the function of each major activity, and the role of each management position in the structure.

The organization structure in MUL must have two primary roles to support the full-fledged implementation of strategic programmes, and to permit the normal conduct of the firm's operation activities.
The objective of production planning in MUL must be to meet customer delivery dates at a minimum overall cost by planning the sequence of production activities.

The production planning in MUL is divided into, a) Periodic decisions which include selection, design and updating of resources, structures, systems and procedures, and b) Continual decisions which are required in day-to-day operation and for control of production system.

Computer aided design system can be used to assist in the creation or modification of cars design in MUL. It is a discipline which provides methodology for specifying designing, implementing, introducing, and using computer based systems for design purposes. It also concerns the utilization of computer system for communication to design information.

The marketing strategy in MUL must consist of three stages, the first stage describes the size, structure and behaviour of the target market, the planned product positioning, and the sales, market share, profit and goals.

The second stage outlines the car's planned price, distribution strategy, and marketing budget.

The third stage describes the planned long-term sales and profit and marketing mix strategy.

MIS in MUL has the following four phases in its life cycle:

1. Study phase. It is concerned with identification of the problem and study of the present system and its effectiveness.
2. Design phase. It is concerned with identification of the function to be performed and study of the input/output and life cycle design.
Development phase. At this stage, the decision about the selection and use of hardware and software is taken.

Implementation phase. At this stage, the system so designed is given practical shape and is adopted for use.

MUL must follow three different states of decisions, decisions under certainty, decisions under risk, and decisions under uncertainty.

MUL can use different types of computers, like, super computers, mainframes computer, midrange machines, workstations, micro-computers, laptops, hand-held computers, and pen-based computers.

A database model is a way of organizing data and its interrelationships. There are three models which MUL can use, they are hierarchical models, network models, and relational models.

The organization may also create a post of Systems Coordinator. He must be able to involve other professionals and draw-up a systematic plan of action. Thereafter, he should act as a catalyst in its implementation. He should also be responsible for sustaining the system. He should have rich experience in computer science. A conference of information service must be convened after a certain interval. This type of conference should be attended by the representatives of functional users as well. EDP seminars/conferences on various functional disciplines should also be conducted. Periodically news-letters, magazines and other literature relating to information management and computer technology should be brought out.

It is imperative that the selection of computer systems is made only after exhaustive Benchmark studies. There are many other attributes like support, organization structure etc. which
should also be considered before selecting a computer system. It is again emphasised that the initial selection of computer systems will be very crucial for long term EDP growth. No short-cut measures should be applied for hastening the installation of the system.

Information requirements at all levels are met more effectively if the analyst and the user work together to tailor the information output to fit the user’s needs. The systems that produce and disseminate volumes of irrelevant data to users may be efficient data processors, but poor information providers. The system analyst in the organisation if appointed, can improve the effectiveness of information output by employing one or more of the following six basic methods in MUL.

1. Filtering Method

The filtering method is based on the premise that various levels of decision makers require various levels of detailed information to perform their duties. The higher the level of decision making, the less detailed information is required.

2. Monitoring Method

The monitoring method allows the system to keep a close check on the flow of data, and automatically reports information only when certain criteria are met.

3. Modelling Method

The modelling method uses various logical mathematical models to transform data into information. This method provides information which is predictive in nature.

4. Interrogative Method

The interrogative method relies on the decision maker to format a specific query to the data base to meet a specific need.
5. **Strategic Decision Centre Method**

   This method refers to gathering information from sources primarily outside of the organisation to provide relevant information for strategic decision maker.

6. **Key Variable Reporting Method**

   This method assumes that the success of an organisation is in a large measure determined by how well it does on a few critical factors.

   An important part of the overall design of an information system is to exercise effective controls too. During the specific design phase the system analyst must identify and implement a series of processing controls to ensure the integrity and reliability of the information system. These processing controls can be categorised as follows:

   1. Input controls
   2. Programming controls
   3. Data-base controls
   4. Out-put controls and
   5. Hardware controls.

   Security, another form of control, must be considered during the design of an information system.

   In large information systems a separate group might be responsible for establishing security. The systems analyst must also implement some security controls into the system. The security considerations include (1) access to data files, (2) access to physical components, (3) transmission intervention, and (4) software disruption. Procedures for recovery after intentional or unintentional disasters must be designed and implemented.
Evaluation of an information system is an important part of the evolutionary process of design and implementation. Evaluation can be carried out in terms of both efficiency and effectiveness. The aim is to obtain a high level of both efficiency and effectiveness, but the primary factor is effectiveness which concerns the extent to which the objectives of the system are met. K J Redford’s MIS model can be used as an ideal model to design and develop an integrated MIS in MUL. The detailed design that is appropriate to a particular organisation depends upon the circumstances in which the organisation finds itself at the time.

The basic design meets the initial specifications for an organisational information system, which are being mentioned here:

- The system lays emphasis on satisfaction of managerial needs for information.
- The system provides facilities to support routine operational and administrative functions as well as to support the various functions of management at the middle and the higher levels of the organisation.
- The system outlined in this design matches the pattern and structure of decision making and management within the organisation.
- The design makes an allowance for flexibility and modular implementation so that any changes necessary in the system can be introduced quickly economically and within a minimum of disruption.
- The design allows that the system's output be matched to the capacity of managers to absorb information so that the problems associated with information overload can be avoided.
It may be inferred from the foregoing discussion that Maruti Udyog Ltd (MUL) has a well-designed and well-knit Management Information System responding to the changing technology and varying customer needs and requirements. MUL has catered the need of all segments of the market by periodically introducing new products in different periods as and where required. Based on the customer feedback, MUL has adopted the customer-oriented approach supported by extensive sales orientation. The existence of MIS in MUL has increased production with qualitative products of varieties which ultimately enhancement the sales and exports of Maruti cars in India as well as abroad and able to retain its market leadership in automobile sector despite stiff competition for a number of domestic as well as foreign players.