Though development of management as a science is of recent origin, the organised societies throughout the civilized history have felt the need of good management. Administration and management of states has been of great concern to the ancient Greek philosophers, like Plato and Aristotle. As far back as 1300 B.C., the Egyptians have written treatises on management of the then existing bureaucratic states. The Church and the army would not have been as successful as they were without the adequate knowledge of the principles of management. The concept of line & staff, and formal organisational authority relationships originated from the army & Church organisations & continue to this day.

By the middle of the 18th century, the Industrial Revolution brought about an evolution in the management theory, and such concepts as specialization of labour, competitive economy, the economic men, management operation, etc., emerged which helped the management practice to develop in the 19th century. The people responsible in developing this trend towards management were Adam Smith and Alfred G. Marshall. By the beginning of the 20th century, the industrial manage-
mental largely remained a matter of intuitive understanding and experience. During the 20th century, F.W. Taylor (1856-1950) conducted experiments on management and published them in 1911 in the form of a book, *The Principles of Scientific Management*. His experiments had a profound influence on management & its thought and practice. F.E. Taylor began to be called "the father of modern scientific management". Taylor was mainly concerned with the efficiency of managers and workers at the shop level. Taylor developed many of the present day industrial engineering methods, which include time and motion study, scientific determination of each element of man's job, selection and training of workers, management-labour relationship, workers participation, responsibility, use of standards in control, separation of planning from execution, the functional organisation, the exception principle, etc.

Taylor believed that productivity of a worker was a direct function of the wage incentives. He stressed micro-approach towards management. Taylor stressed the importance of analysing and measuring the elements of human work. He laid down the procedure for such analysis as under:

1) Divide the work of a man performing any job into simple elementary movements.

2) Pick out all useless movements, and discard them.
3) Study, one after another, just how each of several skilled workmen make each elementary movement. And with the aid of a stop watch select the quickest & best method of making each elementary movement known in the trade.

4) Describe, record and index each elementary movement with its proper time, so that it can be quickly found.

5) Study and record the percentage which must be added to the actual working time of a good workman to cover unavoidable delays, interruptions and minor accidents, etc.

6) Study and record the percentage of time that must be allowed for rest, and the intervals at which the rest must be taken, in order to offset the physical fatigue.

7) Study and record the percentage which must be added to cover the newness of a good workman to a job, the first few times that he does it.

8) Add together into various groups such combinations of elementary movements as are frequently used in the same sequence in the trade, and record and index these groups so that they can be readily found.

Taylor also tried to develop systems for "getting the right materials and the right tools in the right condition to the right man at the right machine with the right instructions at the right time." All the work of the shop had to be carefully planned in advance. Taylor did not limit the analysis...
of operation methods to human movements and work elements only. He extended this operational analysis to the study of operating variables of materials and machinery as well. He understood the importance of considering all factors together to establish the most effective operating system.

Though Taylor's approach was micro, yet he considered all operations as interconnected networks, and thus laid the foundation of systems approach to the study of industrial production problems.

F.B. Gilbreth and L.M. Gilbreth:

Gilbreths were contemporaries of Taylor. They carried Taylor's work for beyond the workshop level. Gilbreth started with brick-laying, and moved to such experiences as constructions of canals and towns, redesigning of type-writers and household appliances, methods of fitting shoes to customers & of surgical operations, developing military procedures, etc. To Taylor's stop-watch time study, Gilbreth added scientific motion study. Gilbreth used motion pictures, chronocycle graphs, wire motion models, to study the movements involved in doing a job. Gilbreth developed new concepts in the field of human activity in different work situations, generalised principles about its basic elements, and then applied these principles to the improvement of specific activity structures.
Gilbreth always tried to think not in terms of the features of a craft per se, but in terms of the fundamental human motions involved in working with particular tools, materials, equipment and procedure. Analysis of such human motions could help in redesigning things so that more effective use of human energy could be made.

In 1914, Mrs. Gilbreth published a book *The Psychology of Management*. In 1917, the Gilbreths jointly published a book in which they detailed the elements of motion study. Methods study was formulated into motion study and divided into three parts:

1) Study of the variables of the worker,
2) Study of the variables of the surroundings, equipment, and tools,
3) Study of the variables of the motion itself. Manual work action was analysed into elements called therbligs.

The elements were named according to their purposes and consisted largely of simple hand, eye, and mental functions as follows: search, find, select, grasp, transport empty, transport loaded, hold, release load, position, pre-position inspect, assemble, disassemble, use, unavoidable delay, avoidable delay, plan and rest. Though the Gilbreths made the study of individual human operations as the focal point, yet
they realised the importance of the whole system structure with respect to the efficiency of the individual human operator. Much of their work influenced the present organisational theory. In fact, Taylor and Gilbreth can be rightly considered the fore-runners of the present day operations research in particular and the quantitative school in general.

Taylor, through his findings, reduced the yard labour requirement of Bethlehem Steel Company from around 500 men to 140 men. Similarly, Gilbreth, through his methods, was able to increase productivity per hour from 120 bricks laid to 350 with a reduction in fatigue.

The works of Taylor and Gilbreth aroused a lot of interest and activity in the field of economics of production. Dexter Simpson Kimbell (1865-1952), in 1904, offered an elective course on the economics of production, incorporating Taylor and Gilbreth principles. Many of the early papers of Taylor and Gilbreth were presented to the American Society of Mechanical Engineering. In 1912, the Taylor Society was formed which in 1936 became the Society for the Advancement of Management.

Henri Fayol (1841-1925), a French industrialist and a contemporary of F.W. Taylor, published a book in 1916 in French, which provided an ‘explicit and broad framework of
general principles of management". Unfortunately, this book became available in English only in 1942. It was only in 1950s that the writing of Fayol influenced the American management thought and practice. Fayol is called "the father of classical management theory". His major contribution was to define the basic elements of administration and to list his general principles of management. According to Fayol, management is "universal", and everywhere it has the same basic elements. These basic elements are listed below:

1) Planning, 2) Organising,
3) Commanding, 4) Co-ordinating,
5) Controlling.

These elements were called by Fayol the duties and responsibilities of management. Fayol recognised that the principles of management were universal, and were equally applicable to business, military, and institutions whether political or religious. For Fayol, the principles of management were flexible and not absolute. Some of the principles of Fayol have relevance even today and are listed below:

1) Division of work.
2) Authority and responsibility - wherever authority is exercised there is responsibility.
3) Discipline - good superiors, fair agreements and judicious sanctions are means of maintaining discipline.
4) Unity of command.
5) Unity of direction - "one head and one plan for a group of activities having the same objective".
6) Subordination of individual interests to general interests.
7) Remuneration of personnel - pay should be fair and offer maximum satisfaction to both employer and employee.
8) Centralisation - individual degree of centralisation of authority is a matter of proportion and of finding the optimum degree for the specific organisation.
9) Scalar chain - chain of command must be preserved unless authorised otherwise.
10) Order - "A place for everything and everything in its place".
11) Equality of treatment - kindliness and justice elicit loyalty and devotion.
12) Stability of the tenure of personnel. Unnecessary turnover is both the cause and the effect of bad management.
13) Initiative - initiative is thinking out and executing a plan within the limits imposed by respect for authority and discipline.
14) Esprit de corps - need for team work.

"Harmony, union among the personnel of a concern, is great strength in that concern". "The abuse of written communication & a misguided notion of the motto, 'Divide and rule', are to be avoided".
Henri Foyal provided the broad framework within which the modern management theory developed. Foyal was the first person to recognise the importance of the human element. He strongly believed that production was directly related to the happiness and involvement of a worker as an individual and as a member of the team. He can truly be called "the father of the modern management".

The Hawthorne Experiments

Till the middle of 20th century the individual worker was not really understood in relation to his role with respect to productivity. He was at best considered a bundle of bones, muscles and a set of brain neurous capable of performing certain industrial operations more effectively than the machine and capable of co-ordinating the machine activity. The fact of his being a human being with human emotions was never visualised by the then industrial manager. It was by and large recognised that better wages, better working conditions and better status, fear of sanctions etc. were enough to motivate a worker towards better productivity. Controlled experiments on human factors approach to management were performed at Western Electric's Hawthorne plant in Chicago. These experiments essentially dealt with human relations and motivational research. These experiments proved that "Worker productivity is affected much more by human factors - the way workers feel
about their interaction with others in the group, their attitudes and their sense of recognition by peers & superiors. Non-recognition of a worker and relegating him to insignificance results into his becoming useless and a drag to the organisation.

Howthorne experiments brought the worker into the focus of attention. "The importance of human relations, worker motivation and managerial leadership began to be emphasised. With this the contributions of behavioural sciences became important and were incorporated towards building up the modern organisational theory.

**Development of Theory-Y in contrast to Theory-X:**

Douglas McGregor published in 1960 his book *The Human side of Enterprise*. This book summarises his findings and conclusions made on a scientific study of the managements which he calls Theory-X and Theory-Y. Theory-X is the traditional functional approach to management based upon conventional assumptions about human behaviour. These assumptions according to McGregor are:

1) Human beings are inherently lazy and will shun work if they can.
2) People must be directed, controlled and motivated by fear of punishment or deprivation to impel them to work as the company requires.
3) The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, and wants security above all.
McGregor believes that the traditional management has by large acted on these assumptions of human behaviour. The traditional management treats the human worker in a way that he gets dehumanised. The traditional functional approach measures its success by how much the individual worker has been mechanised. Mechanisation of human individual workers is against the Wiener's principle of "Human use of human beings" and causes what Thoreau calls "Quiet desperation". McGregor considers the traditional assumptions about human behaviour as totally wrong and puts forth a new set of assumptions based on behaviour research. This set of assumptions he calls Theory-Y and is listed below:

1) The expenditure of physical and mental effort in work is as natural as play or rest.

2) External control and the threat of punishment are not the only means of inducing people to work towards organisational goals. Man will exercise self-direction and self-control in the service of objectives to which he is committed.

3) Commitment to objectives is a function of the rewards associated with their achievement.

4) The average human being learns, under proper conditions, not only to accept but also to seek responsibility.

5) The capacity for exercising a relatively high degree of imagination, ingenuity, and creativity in solving organisational problems is widely, not narrowly, distributed in the population.
6) Under the conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilised.

The psychological foundations on which the assumptions of Theory-Y are based include Maslow's hierarchy of needs. Maslow identifies five levels of human needs viz. physiological needs, safety needs, social needs, ego needs and self actualization needs. After the basic physiological, safety and social needs are satisfied, man strives towards the satisfaction of ego & self-actualization needs. Theory-Y utilises the motivating forces released as a result of realising the ego and self-actualisation needs. Managers trying to run their industries on the basis of Theory-Y will try to integrate the individual goals with the organisational goals so that while the individual is striving towards attainment of his own goals, he is simultaneously attaining the organisational goals and vice versa. This is at the root of the principle: "Motivation on the job itself". Workers working under Theory-Y atmosphere enlarge their competence, self-control, and sense of accomplishment. Theory-Y holds, "employees are likely to identify with the goals of the organisation because the organisation identifies with their goals. In effect, the organisation is propelled by the motivation of its various members whose individual contributions combine to achieve the overall goals of the enterprise". 
After analysing the theory and practice of both Theory-X and Theory-Y, McGregor concludes, "It is not important that management accept the assumptions of Theory-Y. These are one man's interpretations of current social science knowledge and they will be modified, possibly supplanted, by new knowledge within a short time. It is important that management abandon limiting assumptions like those of Theory-X, so that future inventions with respect to the human side of enterprise will be more than minor changes in already obsolescent conceptions of organised human effort. "The Theory-Y assumptions come under the behavioural school. The behavioural school can be subdivided into two groups, viz., the "Human behaviour group" and the "Social system group". Theory-Y comes under human behaviour group. The other contributors in this area are Elton Mayo & Fritz Roethlisberger, Keith Devis. The behaviour school gives stress on understanding human relations, leadership style, motivation, training and communications. This school has been responsible in generating such movements as, "Bottom-up Management" and "Management by Participation".

The Social System School

This school looks upon management as a system of cultural inter-relationships. The authority relationships are subordinate to the cultural relationships of various social groups working in an industry. This school stresses the co-operation
among workers and compatibility of the worker goals and organisational goals. It attempts to deal with:

1) The organisation,
2) The environment both external and internal,
3) The forces bringing about change & adjustment.

Some of the prominent contributors in this school are Maslow, Argyris, Simon and Herzberg. Maslow developed "hierarchy of needs" theory. Argyris believed that classical approach to management assumptions are based on self-fulfilment. Herbert Simon published Organisations & Administrative Behaviour and revolutionized management thought and practice. Fredrick Herzberg made up to date studies on job enrichment & greatly influenced motivation research & organisational design. Herzberg believes that positive motivation is stimulated by:

1) Removing controls over the worker but holding him accountable for results,
2) Giving a person a complete, natural module of work,
3) Granting a worker additional authority and job freedom,
4) Making periodic reports available to the employee so that he may initiate corrective action instead of being directed to take it.
5) Introducing new and more difficult assignments so that the employee may learn and grow.

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Empirical School:

This school by and large gives stress on experience. "It is more an approach to developing problem solving skill than an attempt to develop a science. The method used is case study". The approach is essentially of developing "cross experience" study. The Managers of various organisations develop seminars for analysing and understanding each other's experiences. One of the contributors in this field is Ernest Dale. Ernest Dale's "Great Organisers" analysed the experience of successful managers and drew generalisations from such analysis.

The Decision Theory School:

Cyert, March and Simon are some of the researchers who developed the school of decision theory. Forrester investigated the nature of decision making in the context of modern military tactics and extended it to industry. This school of thought looks upon managers essentially as decision makers.

The Quantitative School:

This school developed with the development of operations research and other systems techniques involving the use of mathematics. Some of the methodologies used are simulation & modelling O.R., mathematical programming, Monte Carlo technique, queuing theory, game theory, cybernetics, information theory, uncertainty decision analysis, heuristics etc. etc. Some of the contributors in this field are Shannan, Wiener.
Joeldean Von Neumann, Charles Hitch, Ackoff, Churchman & Schlaifer etc. The people belonging to this school try to identify the variables in a problem situation and further try to find the functional relationship between these variables. This helps them in mathematising the problems. Building up mathematical models helps problem solving. Through a mathematical model, the variables get clearly identified & working towards optimization becomes easy. A mathematical model becomes less effective in solving a problem unless methods are clearly developed for quantifying the different variables used in the model.

Development of General Systems Theory:

During the years of World War II multidisciplinary teams were working together to solve war problems. Building up multidisciplinary teams increasingly became a matter of routine to solve intricate problems. It was during these very years, Norbert Wiener coined the word "Cybernetics" for a new discipline which was concerned with control and communication in the animal and machine. Cybernetics deals with self-regulating systems whether mechanical, electrical, or biological. A Russian writer defines cybernetics as "The new science of purposeful & operational control over complicated processes and operations which
take place in living nature, in human society, and in industry. This definition amply makes it clear how the science of cybernetics tries to look upon such varied systems as biological, social and mechanical as inter-related and permeated by a single set of principles underlying their regulation, co-ordination & control. This implies that nature everywhere is governed by a single set of principles and laws and it is futile to study different systems in isolation of each other.
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Systems model of management of organisations based on automatic feedback control mechanism.