Frederick winslow taylor and his scientific management

Mini biography of Frederick Winslow Taylor and his key publications and theories

Mr Frederick Winslow Taylor (1856-1915) was an American industrial engineer who sought to improve industrial efficiency. He was also known as the Father of Scientific Management. He was born on 20 March 1856 into a wealthy family in Germantown, Philadelphia. Due to his deteriorating eyesight, Taylor left law school and started his apprenticeship as a pattern-marker with Enterprise Hydraulic Works in 1874. His early working experience shaped his views of management. He realised the " bad industrial conditions" where workers restricted their output and poor management leading to industrial inefficiency (Daniel A. Wren, 2005).

His apprenticeship ended in 1878 and he worked as a machine shop labourer at Midvale Steel Company. Over the six years, Taylor rose from shop labourer to chief engineer (Robert Kanigel, 1996). In 1881, Taylor started Task Management System where he developed a unique form of supervision called " function foremen" with specialised skills and no subordinate should report to more than one supervisor. This was published in his book " Shop Management" in 1903 (Taylor, 1903). Taylor identified that the low output was due to " soldiering" where the workers deliberately worked very slowly (Clark, 2000). He developed time and motion study on how specific job could be done more efficiently. His main purpose for the study was to prove that " the best management is a true science" with " one best way" of performing a task, which later became known as Scientific Management (Tim Hindle, 2008). In Midvale, Taylor started to set output standard with a differential

rate system of piecework. He started to pay men and not position. This was recorded in his 1895 publication “ A Piece-Rate System” (Taylor, 1895).

In 1893, Taylor decided to concentrate on promoting his theory of scientific management through publications and management consultancy. In 1898, Taylor joined Bethlehem Steel where he conducted his famous pig-iron experiments. His study of handling pig-iron has greatly contributed to the work design analysis and gave rise to method study. Taylor realised the need to match people’s ability to their job requirements. He selected only “ first class man” as his productivity would be several times higher than the average man (Locke, 1982). The concepts of his studies are: Firstly, the development of scientific method to replace the rule-of-thumb method. Secondly, selection and development of workers. Thirdly, the cooperation between the superior and their subordinates and lastly, is an equal division of the work and responsibility between the management and workers (Taylor 1911). Based on the above concepts, Taylor published “ The Principles of Scientific Management” in 1911.

Discussion of social, political, intellectual and economic factors which influenced Taylor and the development of his Scientific Management

Social factor

The working society in the past constitutes natural and systematic soldiering and there is a strong tendency for managers to resort to hierarchy power rather than to trust the workers (Bartlem, CS & Locker 1981).

Due to social loafing in gang, each man becomes inefficient (Lantane, B, Williams, K & Harkins, 1979). Taylor believed that workers engaged in soldiering are due to three main reasons. Firstly, they are fearful that increasing their productivity would cause them or other workers to be unemployed. Secondly, the faulty wage system that was set up by the management encouraged workers to work slowly. Lastly, the methods of working and rules of thumbs handed down from past generation are often very inefficient. Taylor believed that managers could resolve the soldiering problem by adopting and practising his Principles of Scientific Management theory, whereby reduced working hours will contribute to both the worker's wellbeing and greater efficiency (Nyland, 1995). Specifically, Taylor pioneered a method which is known as Time Study that involves breaking down a work task into its various motions, eliminating unnecessary motions, determining the best way to do the job and then timing each motion to determine the amount of production that could be expected per day. In order to solve the wage systems problem which encourages soldiering, Taylor advocated the use of wage incentive plans (Taylor, 1911).

Political Factor

According to Taylor, workers were supposed to be incapable of understanding what they are doing, even for simple tasks. The introduction of his " One best way" system was not accepted by workers and this resulted in a number of strikes.

In 1912, Watertown Arsenal's strike led to a Congressional investigation. Taylor was an ardent opponent of unions (Gabor, 2000). Taylor saw no necessity for unions and this triggered vigorous resistance from the labour

unions in using his system (Daniel A. Wren, 2005). Taylor strongly believed that pay was linked to productivity. He continued his studies and his workers were able to earn higher pay.

Scientific management in US industry was opposed by the unions after Taylor's death. It rebounded strongly later when the industry prepared for the war effort.

Intellectual Factor

Taylor identified ways to improve efficiency. Carl Barth, the mathematician perfected Taylor's time study by designing the Barth slide rule for the application of the metal-cutting system. Henry Gantt invented the Gantt-chart, Frank and Lillian Gilbreth used motion studies as the analytical stepping stone between Taylor's systems. Harrington Emerson improved on Taylor's functional foremen theory and Morris Cooke enriched the Principles of Scientific Management (Daniel A. Wren, 2005).

Admiral Caspar Goodrich, promoted the use of scientific management (Spender JC & Kijne 1996). Taylor's exhortatory lectures in Harvard were a powerful influence in the management education today.

Economic Factor

There was a long period of depression in the year 1873, which led to low capital investment resulting in a small labour market (Taylor 1934, p. 48). Employers forced employees to work long hours at the lowest rate of pay. The uneducated workers believed that they would be unemployed if they produced more.

Taylor implemented the differential piece-rate system that rewarded workers who produced more outputs. He hoped to improve the workers' livelihood and to increase productivity. The immediate result of Taylor's scientific management was the drastic reduction in the prices of goods and raise of wages. This would call for more workers and a larger production scale, which promise an economic betterment for people.

Relevance of Scientific Management to managers today

In modern industry, scientific management proves to be an effective remedy to satisfy the desires and needs of individuals in exchange for power and maximum output. Taylor's focus was on managing work and workers but he drew attention to the importance of selection, training, compensation and motivation, the areas directly relevant to managing people in today's environment (Sultan Kermally, 2004).

Taylor's " one best way" of performing a task is not always the best method for today's worker, but it is important to establish the habit of knowing what the best way is, and the reason why it is the best, and then practising the method until one becomes physically dexterous at it (Copley & Taylor, 1993,). An example is a Quality Service Award organisation, Central Provident Fund Board (CPFB), that also adopts Taylor's time and motion study to find the " one best way" to complete the task in the form of " Standard Operating Procedure", or SOP, for most work processes. Every new employee is required to undergo on-the-job training of SOPs. Another example of Taylor's theory in practice in CPFB is the use of Taylor's time and motion theory, which the Board uses for its award winning Call Centre and counter services. The waiting time for a customer to be served by a

customer service officer is established and measured and targets set as a Key Performance Indicator (KPI).

Today, many organisations are still practising Taylor’s theories of breaking down the job. The SOP or “ one best way” of doing a task has helped workers and management to be more aware of the detailed steps for each business process, even when they are new to the job.

ISO quality standards such as ISO 9001 in Singapore practises Taylor’s first principle “ development of scientific management to replace the rule-of-thumb method”. It reduced waste, rework and customer returns so as to achieve job efficiency. Today’s company emphasises on hiring the right people for the right position. This is in line with Taylor’s second principle of “ scientific selection and development of workers”. One common use of science for selection is to use psychologists in determining an applicant’s suitability during interviews. Taylor’s third principle “ cooperation of the superior and their subordinates” showed that a rested worker in the workplace is beneficial to productivity (Clark, 2000). Creating a happy and healthy workforce is the most critical in today’s managers. For an example, CPFB recognises that staff can only give their best to the job when they have a healthy and balanced lifestyle, by implementing flexible working hours, rest days and carrying out healthy lifestyle activities such as family day, healthy eating day, etc. Taylor’s last principle “ equal division of work and responsibility between the management and workers” fostered the four management functions in today’s management, namely planning, organising, leading and controlling.

Taylor and his disciples have left to modern management the legacy of practices such as work study, organisation and methods, payment by results, management by exception and production control.

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