

Taylor's "Scientific Management Principles": Contemporary Issues in Personnel Selection Period

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Abstract—"Scientific management trend", which claims that there is only one best way to deal with every issue and directs its efforts to finding this way and applying it on production process, underpins today's management science. We still witness the effects of Taylor's insights and theories, who is the pioneer of this trend, on modern management understanding. It is observed that traditional management understanding which was criticised by Taylor is completely ignored in the personnel selection process. Also, it is noticed that a more advanced level has been attained by using the scientific management methods which were pointed out by Taylor in the process of personnel selection. The purpose of this study is to evaluate the harmony of Taylor's insights and techniques in modern management and portray the contributions of Taylor on human resources management in the personnel selection process.

Index Terms—Frederick Winslow Taylor, scientific management approach, human resources management, personnel selection.

I. INTRODUCTION

Even though it existed with the emergence of the first person, management concept which is defined as carrying out the work through people in general, it is thanks to Taylor that it was called as "science". Taylor is a pioneering model due to his initiations for creating the science of production studies. Moreover, Taylor's Principles of Scientific Management titled masterpiece is still a fundamental resource for the ones who do research in this field. It is based on induction and adopts a pragmatic and empiricist method, and its "there has to be a best way to do a certain job" principle has advanced among the others. This principle has inevitably reached to the time and motion study, the equation of employees with machines and finally automation and robot science [1].

Although Taylor made great contributions to the management as a science, he received harsh criticisms as well. The focus of the criticisms he received lies in the fact that he put the human factor into the background. However, we still see that Taylor's many insights are still valid in today's modern management trend. Although his ideas have been harshly criticised, the fact that they are still valid displays the importance of the subject. The idea to select the personnel by means of scientific methods, which is the content of our study, was suggested by Taylor first. Previously, traditional methods had been used to employ the personnel. In the traditional method, an employee was evaluated whether s/he was appropriate for the job or not after s/he was employed. In

this case, both the employer and employee suffered from it. Thanks to the use of Taylor's scientific management techniques, it could be said that this damage is subsidized.

Within this scope, the current study consists of three parts. In the first part, Taylor's life is elaborated since his characteristics are important in the theory he developed. Afterwards, his most significant work titled Scientific Management Techniques is mentioned. In the second part, the selection of the personnel, which is one of the basic functions of human resources management, in Scientific Management Techniques is discussed. In the third section, the state of Taylor's insights, techniques and contributions to today's modern management perception in terms of human resources management within the scope of personnel selection are discussed.

II. TAYLOR AND SCIENTIFIC MANAGEMENT PRINCIPLES

Born into a wealthy family in the US in 1856, Frederick Winslow Taylor wanted to study law, but, had to quit his university education due to certain health problems. Starting as a machinist apprentice in 1874, Taylor noticed that production was limited by the employees and found the opportunity to closely observe the lack of compliance between the employees and employers during his four-year apprenticeship. Taylor started as an employee in Midvale Steel Company in 1878 and having started by noticing the lack of scientific education, he graduated from Stevens Institute Technology as a mechanical engineer in 1883. Later on, he worked in various positions in Midvale and he became a chief engineer in 1884. He had the opportunity to make some observations and experiments in the meantime. He left from Midvale in 1890 and worked as a general director in Manufacturing Investment for three years, Taylor decided to work as a consultant engineer due to the accounting knowledge and engineering past he acquired during his last position. He made great contributions to the development of the companies by applying innovative ideas he developed for some big firms among his customers to increase the industrial productivity [2].

Mentioned as the first intellectual of industrial engineering besides being a mechanical engineer, Taylor did some important studies to increase the industrial productivity. Taylor joined American Mechanical Engineers association in 1885 and presented two articles here. The name of the first article was "Piece Rate". In this article, Taylor suggested changing wage system in order to motivate the ones who work harder. The second article titled "Shop-Management". He focused on management philosophy, emphasized the necessity of high wage and low cost per unit, and therefore

the manager-workman/workwoman collaboration in the selection and training of the personnel in compliance with scientific methods was pointed at in this article. The audience failed to understand what Taylor emphasized by assuming that money was taken into consideration more than systematic managerial work [3]. Taylor collected his ideas in the article titled “The Principles of Scientific Management” published in 1911.

Taylor’s work titled “The Principles of Scientific Management” was adopted in the USA first, and all the managers across the globe later. In this work, he claimed that management is not only made up of theory, but his fund of knowledge took its source from the applications within the factory and continuously evolved. Scientific method should be discussed as a mental revolution rather than a means of productivity which came into fashion at that time. The employers and managers who would realize this revolution should have increased the income by collaborating with each other instead of sharing surplus income [4]. Taylor accepts the collaboration between the manager and workmen/workwomen as an essential principle in the implementation of Taylorism. If the collaboration between the manager and personnel working the organization is not attained, other methods and techniques are of little use. Although scientific method seems to adopt the increase in production, it endeavours to solve the problems between the managers and workmen/ workwomen [5].

Drucker emphasized the importance of Scientific Management Principles as follows: “It is the productivity revolution which removes the discrepancies of capitalism and prevents proletarian class from growing poor, and the person who started this revolution is Taylor” [6]. In fact, this period coincides with the end of nineteenth century and the first half of the twentieth century. This period witnessed the individualism, liberalism, capitalism and similar movements in North America and Europe. Also, this period is the one on which the production, based on the application of these movements, and productivity came into prominence. In other words, it is an era when the behaviours of human were disregarded to a certain extent [7].

Rational Economic Man Theory which is often mentioned in classic economy and grounded on the opinion of people’s acting according to their interests, became the modal on which scientific management philosophy is based. Taylor commenced to work by moving from the Adam Smith’s assumption that people run after their interests. Naturally, one of the factors leading the workmen/ workwomen to work is the wage they receive. In this direction, the workman’s economic interests should be kept at maximum level, and the employer should be enabled to fulfil the production process with the lowest labour cost at the same time [4].

III. SCIENTIFIC MANAGEMENT PRINCIPLES AND PERSONNEL SELECTION SYSTEM

The quality of a working place is determined by the quality of its employees to a great extent. The success of many establishments depends on the labour force which has the talent to carry out the task required for the job and the ability to perform the strategic aims of the establishment. The

success of personnel recruitment, human resources management and methods is possible on the condition that the establishment recruits right people and retains them [8]. The importance of human factor in management is accepted, yet labour among the inputs, which are vital for the formation of an establishment, (e.g. nature, capital, and entrepreneur) has not been able to be on the forefront since the date when scientific management implementations started until 1950s [9].

Personnel Management or in today’s use Human Resources Management’s most difficult and essential task is to select and recruit the personnel since the personnel to be employed plays a crucial role in the revenue of the establishment if it is directly profit-oriented. Provided that it is a public body, it still remains as a significant component in service delivery. The personnel who deliver public service have an indirect influence on political power’s gains. Whether the recruited personnel contribute to the bodies or not is of vital importance for the future of these bodies. Therefore, the bodies are quite imperturbable to recruit the personnel and come up with new methods to select the right person. Private sector not only aims to benefit from the personnel in order to increase profit margin, but also employs the personnel with less cost.

According to Taylor, the main purpose of the management should be to sustain the maximum well-being of all personnel and accordingly realize the maximum welfare of the employer [10].

Taylor expressed that the managers have to shoulder certain responsibilities and fulfil some missions to which they are not accustomed in order to completely understand the scientific method and implement it. He announced these missions and responsibilities as “Scientific Management Principles” which is the title of the book at the same time [4]. These principles are as follows [10]:

- They develop a science for each element of a man’s work, which replaces the old rule-of-thumb method.
- They scientifically select and then train, teach, and develop the workman, whereas in the past he chose his own work and trained himself as best he could.
- They heartily cooperate with the men so as to ensure all of the work being done in accordance with the principles of the science which has been developed
- There is an almost equal division of the work and the responsibility between the management and the workmen/ workwomen. The management take over all work for which they are better fitted than the workmen/ workwomen, while in the past almost all of the work and the greater part of the responsibility were thrown upon the men.

Taken scientific management principles into account, it could be said that they substantially contributed to the modern management. Instead of the rule-of-thumb method which is the first principle, determining how the work is done better and dividing the work into elements were realized as performance/job analysis, work study and work design in today’s human resources management. The second principle which describes the selection of labour force via scientific methods, training and developing them is one of the essential functions of today’s human resources management. Heartily

collaboration between the management and workmen/workwomen which denotes to the third principle is not an available situation as desired by Taylor in today's conditions. As seen in Table I, studies are carried out in order to prevent the clashes from occurring between the manager-workman/workwoman rather than a heartily collaboration. The fourth principle which describes the state of equal responsibility between the management and workman/workwoman in the labour division is located as the division of planning and implementation nowadays. Thanks to this, the manager does not intervene the workman/workwoman in the implementation of work, s/he only deals with planning and the workman/workwoman works to complete the mission given.

As can be understood from these basic principles, Taylor gave the priority to the recruited personnel after developing the management as a science since according to Taylor the performance of the employee is crucial for the productivity of the work place. Generally it is assumed that the interests of the employee and employer are the opposite. On the contrary, scientific management puts the claim that the interests of both parties are the same. If the employer cannot provide the employee's welfare, she/he cannot ensure his/her own welfare on the long term [10]. So to speak, the employer should make an effort to pay high salary as much as s/he can.

IV. THE EFFECT OF SCIENTIFIC MANAGEMENT TECHNIQUES ON TODAY'S HUMAN RESOURCES MANAGEMENT ON THE PROCESS OF PERSONNEL SELECTION

TABLE I: THE STATE OF TAYLOR'S INSIGHTS AND TECHNIQUES IN MODERN MANAGEMENT

PHILOSOPHY	VALIDITY	IS IT ACCEPTABLE NOW?	THE THINGS POINTED AT
Making a scientific decision	Yes	Yes	Management Science: Operational Research, cost accounting etc.
Manager-Worker Collaboration	Yes	Partly	Further management-workman collaboration (prevents the clashes)
Techniques Time and Motion Studies	Yes	Yes	Using standardized times on a large scale
The standardization of studies	Yes	Yes	Standardization process on various grades, labour force engineering
Mission	Yes	Yes	Management by objectives, reward system enriched with feedback
Subsidies	Yes	Increasingly	Incentive wage system
Individualized study	Partly	Partly	Risk acceptance of groups /group thinking-social unemployment/the conditions of group decision making
Executive trainin	Yes	Yes	Personnel management and developments in industrial psychology
Scientific selection	Yes	Yes	Personnel management and developments in industrial psychology
Shorter working hours/ rest range	Yes	Yes	Common use of rest breaks in a week for 40 hours (or less)

We could see the validity and acceptability of Taylor's

insights and techniques which aim to increase the labour productivity and count the worker as one of the mechanical devices to reach this aim in Table I [11]. The ideas he built his philosophy on are acceptable in today's management science and it is observed that these ideas have a worldwide impact since the management is universal.

Taylor's highlighting the importance of recruiting the right personnel and training of them, and regarding it as a part of the management's mission protracted, in other words, it served for labour protection. It is because of the fact that it is not easy for an employer to give up on an employee who is recruited and subject to training unless it is really necessary. However, previously it was assumed that anybody can do anything and the cost of giving up on somebody was disregarded [12].

Today the process of providing human resources for the establishments starts with human resources planning. Personnel selection is one the challenging issues dealt by human resources executives. Yet, it is not possible for every organization to staff and carry out the selection process in the same way. We could claim that the organizations use different personnel selection techniques as a result of the organizational and environmental factors on personnel recruitment [13].

Recruitment in today's human resources management has developed thanks to Taylor's personnel selection via scientific methods. Particularly, we observe competence determination operations carried out by private sector before recruitment takes place. So to speak, work analysis is implemented. Afterwards, personality tests are applied in order to determine the candidates who are apt for the job requirements and recruitment interviews are held via semi-structured behavioural interview techniques in the light of these evaluations. The interviews dwell upon competence identifying questions and the candidates are eliminated based on their competence evaluations [14]. Unlike private sector, recruitment differs in public sector. There are some requirements to be met in order to be a public official. The state can fulfil its mission better with the help of qualified and talented personnel [15]. Public bodies have to make an equal and fair selection while electing the personnel. Although selection methods differ from one country to another, central personnel selection with reference to equality seems to be a more objective option. In private sector, the personnel selection is made via certain exams prepared by Human Resources Unit if it is a big establishment. On the other hand, the relationship between the employee and employer is of more importance in small establishments. It could be said that it is difficult to implement the scientific management techniques here.

On a study carried on a group, Taylor determined that while a pig iron girder carried 12, 5 tons in a day per person, this number reached to 47 tons when scientific management techniques were used. It was time for the selection of the personnel who would carry this pig iron. Taylor defines the scientific selection of the personnel for this job as follows (Taylor, 2013:44):

"In dealing with workmen under this type of management, it is an inflexible rule to talk to and deal with only one man at a time, since each workman has his own special abilities and limitations, and since we are not dealing with men in masses,

but are trying to develop each individual man to his highest state of efficiency and prosperity. Our first step was to find the proper workman to begin with. We therefore carefully watched and studied these 75 men for three or four days, at the end of which time we had picked out four men who appeared to be physically able to handle pig iron at the rate of 47 tons per day. A careful study was then made of each of these men. We looked up their history as far back as practicable and thorough inquiries were made as to the character, habits, and the ambition of each of them. Finally we selected one from among the four as the most likely man to start with. He was a little Pennsylvania Dutchman who had been observed to trot back home for a mile or so after his work in the evening, about as fresh as he was when he came trotting down to work in the morning. We found that upon wages of \$1.15 a day he had succeeded in buying a small plot of ground, and that he was engaged in putting up the walls of a little house for himself in the morning before starting to work and at night after leaving. He also had the reputation of being exceedingly "close," that is, of placing a very high value on a dollar. As one man whom we talked to about him said, "A penny looks about the size of a cart-wheel to him..."

Here we observe that Taylor applied one-to-one interview and group interview techniques following the observation technique on the personnel. In fact, there is a matter of a rigid elimination so as to recruit the right person for the job because according to Taylor if the right personnel are employed, maximum productivity is acquired and maximum welfare is attained as a result of maximum productivity. Both the employee and employer will increase their interests to a maximum level in terms of income and happiness. It becomes more of an issue for the employer who increases his/her profit to share it with the employees. Taylor asserts that the employee will be more content if she/he makes more production. As a result of this, she/he will feel more worthy, regard himself/herself as a high-waged employee and endeavour for the continuity of this situation.

V. RESULTS AND EVALUATION

Although known as the father of management science, he has received very harsh criticisms. Seeing human factor as commodity is one of the primary criticisms directed towards Taylor. Behavioural Approach writers have carried out substantial studies to develop Taylor's ideas. Hawthorne experiments could be given as an example for this. Although the studies seem to refute Taylor's ideas, today we witness that most of his ideas are the basis of implementation. Especially, even if the scientific selection of the personnel, which is the title of our proceeding, differs from one country to another, the same logic works in principle.

Private sector gives more importance to the personnel selection since it acts in the direction of profit since it will be a material and moral burden to discharge the personnel both for the establishment and the employee after recruiting non-qualified personnel. It could be said that Taylor was effective in the development of long term employment by suggesting recruiting the personnel by means of scientific methods. It could also be expressed that this case is different in public bodies because it becomes harder for the public official to be dismissed from compared to the private sector.

Therefore, public bodies should pay more attention to the selection of personnel. However, private sector pays more attention to the selection of the personnel. Moreover, Taylor's ideas are taken to a step further and some companies whose mission is to recruit the personnel for the work places have come up in the private sector. Nowadays, many big companies procure their personnel needs by means of "mediator human resources companies".

To sum up, Taylor has substantially contributed to today's human resources management and his theories form a basis for personnel selection, being one of the most important functions of personnel management. Although he has been criticised for putting the human factor into the background, most of his ideas still survive. No matter how much human resources management change and develop, Taylor's ideas will provide a basis for it. Perhaps techniques will change, but the essence of it will remain the same.

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