



F. W. Taylor and scientific management

In the first of a series of articles on motivation theorists, Simon Harrison considers the contributions of F. W. Taylor and his work on scientific management

Frederick W. Taylor has been a controversial figure in management circles ever since his pioneering work on scientific management in the 1890s and 1900s. The resulting ideas were published in his *Principles of Scientific Management*, in 1911. Today, he is often portrayed as a villain, whose methods have enslaved workers to a life of monotonous drudgery. However, Taylor's original intention was to create harmony between managers and workers, by allowing both groups to raise their earnings and hence their standard of living.

The historical background

Taylor was working in America at the turn of the twentieth century, a time when new technologies and forms of production were being introduced. Simultaneously America was experiencing a huge influx of migrant workers from Europe. These workers often came from poor agricultural regions, had little knowledge of the English language, and generally no experience of disciplined work in a factory.

Taylor himself, although from a privileged background, had worked alongside such workers. He observed the inefficiencies and poor working practices that he believed were holding back the wealth of employer and employee alike.

Taylor laid the blame firmly at the feet of managers. Prior to Taylor, the standard form of managerial direction was an initiative and incentive system. Management specified production requirements and left workers to decide how they would do the task and which tools they would use.

Taylor's objections to this were two-fold: (1) The poor education levels of workers meant that they were ill-equipped to plan their own work, and used methods that were based on untested 'rules of thumb'. Often, workers would bring their own tools, which were not always suited to the job at hand, dramatically reducing productivity.

In almost all the mechanic arts the science which underlies each act of each workman is so great and amounts to so much, that the workman who is best suited to actually doing the work is incapable of fully understanding this.

(2) Workers were inclined to 'soldier', by which Taylor meant to slack off and not give maximum effort. Taylor felt that there were two main reasons for this — the fear that higher productivity would lead to job losses, and also a natural tendency in workers not to want to work hard. 'In the majority of cases (this) man deliberately plans to do as little as possible.'

Because work was directed by foremen who were simply promoted workers rather than managers, this soldiering sometimes

became formalised in the payment system. In one factory, if tool and die makers exceeded a certain output per day, then foremen would dock their pay for each surplus item, a major disincentive to being productive.

Taylor proposed that the planning and directing of work should be diverted into the hands of those most capable (managers), leaving workers to follow instructions given. 'This specialisation of tasks would lead to a dramatic increase in productivity which would benefit both employer and employee alike.

Scientific management

Having separated out the planning function, efficiency could be increased by carefully planning workers' movements and work in the most efficient manner possible. The prevailing situation in which each worker used their own techniques and tools was impossible to monitor, and also inherently inefficient. Taylor proposed that jobs should be standardised and simplified so that they were broken down into core elements. These could then be distributed between workers according to their abilities, each of them performing one set of actions. Taylor stressed the need for workers to be scientifically selected for jobs according to their abilities, rather than jobs being given to friends

Taylor's methods were highly influential, most notably on the mass production processes introduced at the Ford Motor Company and acquaintances. While obvious today, this was quite radical at the time.

The mechanism through which this standardisation and simplification was to be determined was 'time study'. Generally, Taylor focused on undemanding, repetitive tasks, selecting above-average workers to carry out operations under expert supervision. A variety of different methods would be analysed for each task, which would involve careful timing and monitoring of every action that was involved in the process.

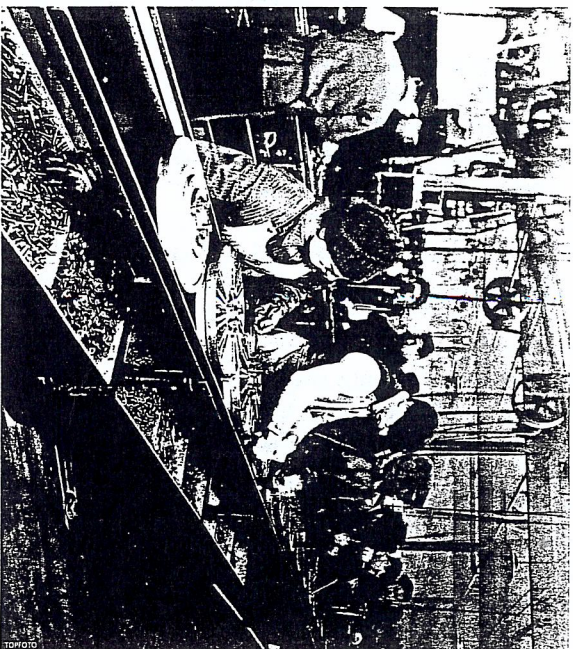
The aim was to break down the task into small, simple sub-tasks which could be done quickly and efficiently, and be monitored. This was a major breakthrough compared with previous practice. In the past, each worker had used their own methods and tools, and so it was impossible to compare and measure tasks. The ultimate goal was that all workers would use the 'one best way' of carrying out any task, thereby revolutionising production relative to what had gone before.

Taylor and motivation

It is a misconception to call Taylor a motivational theorist. Taylor was interested in productivity, and his thoughts on motivation enter into his work only as a means to achieve higher productivity.

Taylor believed in the idea of 'rational man'; that employees sought only to maximise their own wealth. To work without reward would be irrational, so workers would respond directly to financial inputs. As an engineer, Taylor viewed workers in much the same way as he might view a machine. To make an engine work faster required more power; for a worker to work faster, it simply required more money.

Thus, Taylor believed it was essential to make a direct link between output and pay, and his key proposal was a differential piece rate. This system offered a very low rate of pay per unit up to a certain level of output per day, but a much more generous rate per unit once that output had been reached. This, Taylor argued, would give workers a real incentive to maximise output. If they only produced sufficient units to earn the lower rate, they wouldn't really make enough to live.



Taylor's approach can be summarised as:

- a clear division of tasks between management and employees (managers plan, employees act)
- the systematic study of work to allow
- the 'one best way' to be determined
- the scientific selection and training of workers for tasks, so that the most appropriate worker is selected for each task
- payment by results using a differential piece-rate system, so that workers are incentivised to invest effort

For Taylor, productivity increased by an average of 122%. Labour costs were reduced by 38% and workers' earnings rose by 18%. These gains demonstrate to an extent one of Taylor's original goals, that both employee and employer would benefit from the changes. Taylor believed that, as a consequence, both would welcome the changes leading to 'intimate and friendly cooperation between the management and the men.'

The evidence

Taylor claimed spectacular successes for his methods. One well-known study involved Schmidt, a labourer at the Bethlehem Steel Works, whose job was to load 92-pound pigs of iron into wagons. Taylor persuaded Schmidt to change his way of working to what Taylor considered to be the 'one best way'. The results were impressive, with Schmidt loading 47.5 tons of steel per day instead of the 12.5 that would have been his norm. Schmidt's wages rose from \$1.15 per day to \$1.85 (1889 prices). Within 3 years, costs of handling each ton of iron had been cut by 50%, and labourers had been reduced from 500 to 140, with each of the remaining 140 labourers earning 63% more per day.

Within 40 years, it was claimed that in firms using Taylor's principles (including

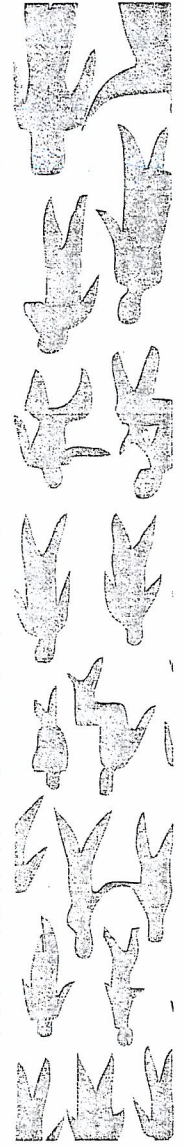
The reality, however, was somewhat different. Before Taylor, workers had directed their own work. Afterwards they completed simple repetitive tasks without any input. All we want of them is to obey the orders we give them, do what we say, and do it quick.'

The consequence was the dehumanising of work. In another memorable quote, Taylor compared the pig-iron loaders to oxen — a pig-iron handler 'shall be so stupid... that he resembles in his mental make-up the ox.' Hence, Taylor designed tasks to be so simple as to require no input or initiative from workers. What Taylor was overlooking was that all workers have more to contribute than sheer muscle. Schmidt, for example, was sufficiently talented to build his own house in evenings after work.

This meant that the industrial harmony that Taylor predicted never materialised,

A-Z of AS marketing and finance

- A — is paid-for communication with customers.
- B — point is where revenue equals costs.
- C — keep firms thinking about how to improve.
- D — to profit centres can help motivate managers.
- E — strategies can prolong a product's profitable lifetime.
- F — costs may change, but not as a result of output changes.
- G — an upbeat phase in the product life cycle.
- H — may prove a better way to make a decision than careful research.
- I — costs are overheads, such as head-office expenses.
- J — mail is a term used for leaflets posted in a poorly targeted direct mail campaign.
- K — the market is a strategy for high pricing.
- L — assets gives possession without ownership.
- M — where buyers meet sellers.
- N — is cash in minus cash out.
- O — are a highly flexible way to borrow from a bank.
- P — child: a product with a low share of a growth market.
- Q — research measures the percentage of responses to closed questions.
- R — is quantity sold multiplied by price.
- S — capital provides long-term funding for business.
- T — are short-term responses to opportunities or threats.
- U — a feature that only one product has.
- V — is the effect on profit when actual results vary from budget.
- W — capital is the day-to-day finance for running the business.
- X — Microsoft's rival to Sony's Playstation.
- Y — a major internet service provider.
- Z — budgeting can stop costs from creeping ever-upwards.



Indeed, some would say that much of today's cutting-edge management thinking stems from Taylor's approach. In a speech on Toyota's 'Thinking Production System' in 2003, Teruyuki Minoura, Toyota's manufacturing director, spoke about the need for employees to be involved in helping Toyota to improve, but also about the need to 'train people to follow rules and standards as if second nature', which sounds strangely familiar.

While it is true that firms such as Toyota are involving staff in decisions, there is still a sense that they are searching for the best way of operating, and that once that way has been found, employees must follow it until a better one is discovered. Perhaps not so much has changed as might at first have been thought.

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across America and Europe, and consequently the rising power of trade unions. Since then, motivation theory has moved on, taking into account the psychological needs of workers, their interactions with other employees and the valuable inputs that they can make. Modern developments include empowerment and team-work, which are viewed as more effective ways to get the most out of employees.

Nevertheless, Taylor was a man of his times. The employees forming the core of his studies were poorly educated, with low levels of skills and literacy, and were generally living in poverty. Taylor's methods did succeed in raising the wages of employees who worked in organisations using his principles. Although some of his ideas appear outdated today, his legacy lives on — the ergonomic design of aircraft cockpits and the efficient layouts of factories are designed to minimise wasted time.

and in fact the reverse was often true. When Renault introduced scientific management principles in 1912, it led to strikes and riots at their Billancourt plant. Similar industrial unrest was observed elsewhere, resulting in the US Congress banning Taylor's methods in the defence industry, fearing that strikes might disrupt America's military preparations.

The biggest criticism of Taylor is not of his scientific management methods of work, which are these days accepted as commonplace. Rather, the criticism centres around the dehumanisation of work, the assumption that workers are purely motivated by money, and the assertion that labourers can have nothing to contribute by way of ideas and suggestions. Taken together, these three beliefs contributed to growing industrial unrest

Conclusion