

The birth of Production Management theory

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- **At the end of XIX century** the production of general goods was based mainly on human ability. This is called **handicraft period**.
- Handicraft is not disappeared at all but is confined to the luxury products, where the unicity, authenticity and originality of the product are more important than the cost and the delivery time.
- The birth of the Production Management is normally indicated with the issue of the book of **Frederick Taylor “The Principle of scientific management”, in 1911.**
- Very often the theory of Taylor, defined as “Taylorism” has been characterized by a negative meaning, as something inhuman or theory of exploiting workers.
- Everybody have in mind the application of his theory in the XX century, e.g. the famous movie of Charlie Chaplin “Modern times” but inside the original thought of Taylor the concepts are quite different.
- Let’s read the opening of the book



The opening of “The Principle of Scientific Management (1)”



The principal object of Management should be to secure the maximum prosperity for the employer, coupled with the maximum prosperity for the employee.

The words “maximum prosperity” are used, in their broad sense, to mean not only large dividends for the company or owner, but the development of every branch of the business to its highest state of excellence, so that the prosperity may be permanent.

In the same way maximum prosperity for each employee means not only higher wages than are usually received by men of his class but, of more importance, still it also means the development of each man to his state of maximum efficiency, so that he may be able to do, generally speaking, the highest grade of work for which his natural abilities fit him, and it further means giving him, when possible, this class of work to do.

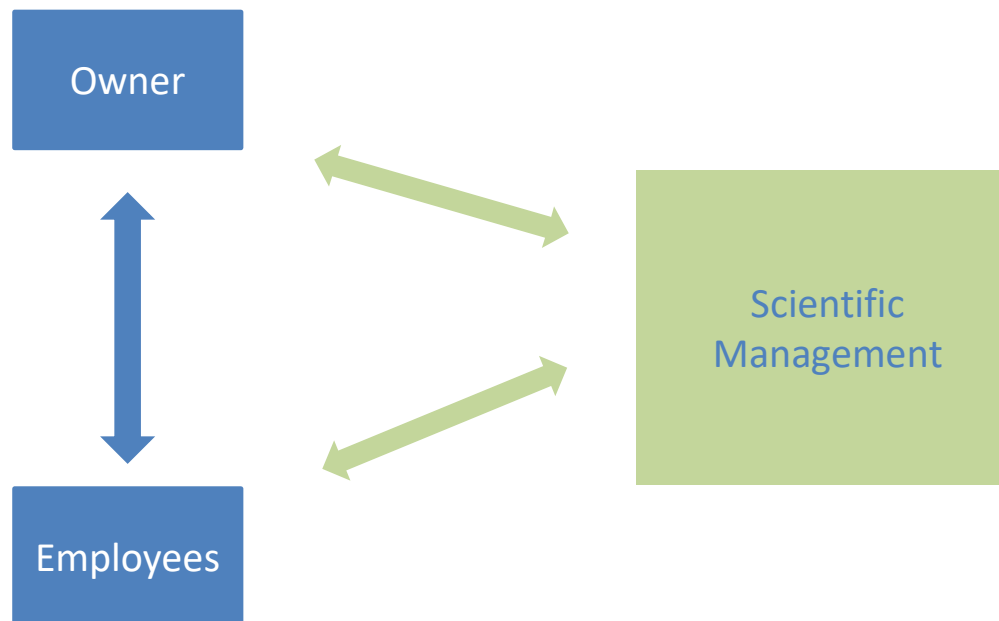
(2)

It would seem to be so self-evident that maximum prosperity for the employer, coupled with maximum prosperity for the employee, ought to be the two leading objects of management, that even to state this fact should be unnecessary.

And yet there is no question that, throughout the industrial world, a large part of the organization of employers, as well as employees, is for war rather than for peace and that perhaps the majority on either side do not believe that it is possible so to arrange their mutual relations that their interest become identical. **The majority of these men believe the fundamental interests of employees and employers are necessarily antagonistic.**

Scientific Management, on the contrary has for its very foundation the firm conviction that the true interest of the two are one and the same; that prosperity for the employer cannot exist through a long term of years unless it is accompanied by prosperity for the employee and vice versa.

The Industrial triad



The pillar of Scientific Management



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In summary the main concepts of Taylor's scientific approach are:

- **The management must participate to the production** beside the workers.
- **Precise analysis and not “rule of thumb”** – The precision requires to know a lot of parameters in order to control them and optimize.
- **Collection of data is essential to know the process** – and to improve it...
- **An optimized organization takes to a better efficiency with cost reduction.** Sometimes the optimum cannot be reached with a single direction but with a combination of actions that can be seen only from a superior point of view
- **The production phases must be regulated by a precise guideline called “process cycle”.** It is made of elementary operations
- **Elementary operations make easier the description, avoid the necessity of skilled people, can increase the volumes and reduces the costs, define exactly the necessary equipment and the tools with the intent to minimize the surprises.**

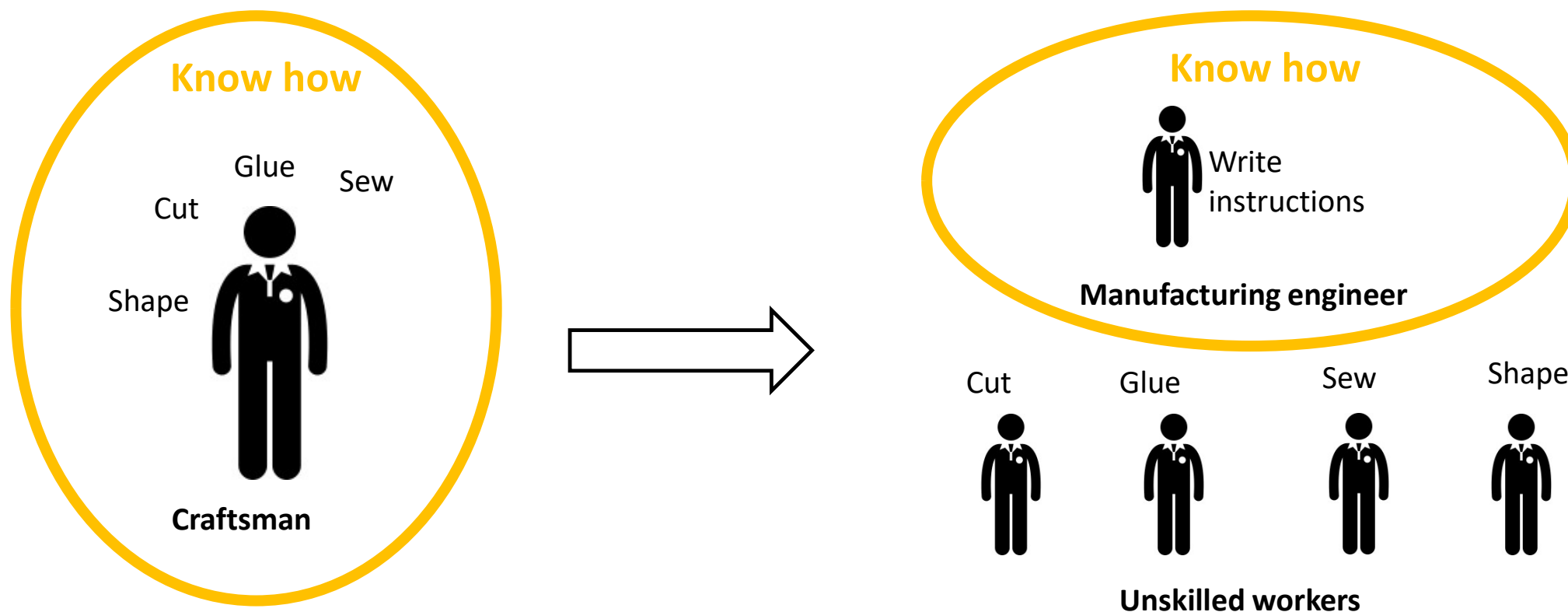
Handicraft vs series production

Example of current handicraft: Salvatore Ferragamo shoes production in Florence

“A complex construction carried out in the Salvatore Ferragamo artisan workshops that includes 260 separate and standardized phases that require over six hours of work by **an expert craftsman** and over **four days of putting the upper-shoe into shape.**”



Creation of manufacturing engineer



Series production summary



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- As said before the series production is characterized by a precise sequence of elementary operation that can be done by different persons and even more persons per operation depending only by the **capacity target**.
- The **manufacturing engineer** define the process cycle to reach the required capacity. Further the **manufacturing engineer** defines equally the tools, the equipment, the target time, the quality inspection and the thresholds to accept the operations respecting safety, quality and ergonomic.
- A **Layout engineer** studies the optimal equipment, material and workers placement to execute the operations.
- The **Plant staff** (workers and managers) have the objective to execute the prescript process to reach the target capacity and improve throughput and conditions (cost, ergonomic)

Example

- Total work 1 hour
- A cycle divided by 6 men means 10 min for each
- A cycle divided by 60 men means 1 min for each
- In a sequential line there is a man every meter so the line must be 6 m in the first case 60 m in the second case.
- So, 1min cycle time and 1 meter/operations mean a chain rate of 1m/min
- If the rate is increased (like in the movie) from 1 to 1,5 m/min, the cycle time decrease from 1min to $1/1,5 = 0,66 \text{ min} = 40 \text{ s}$