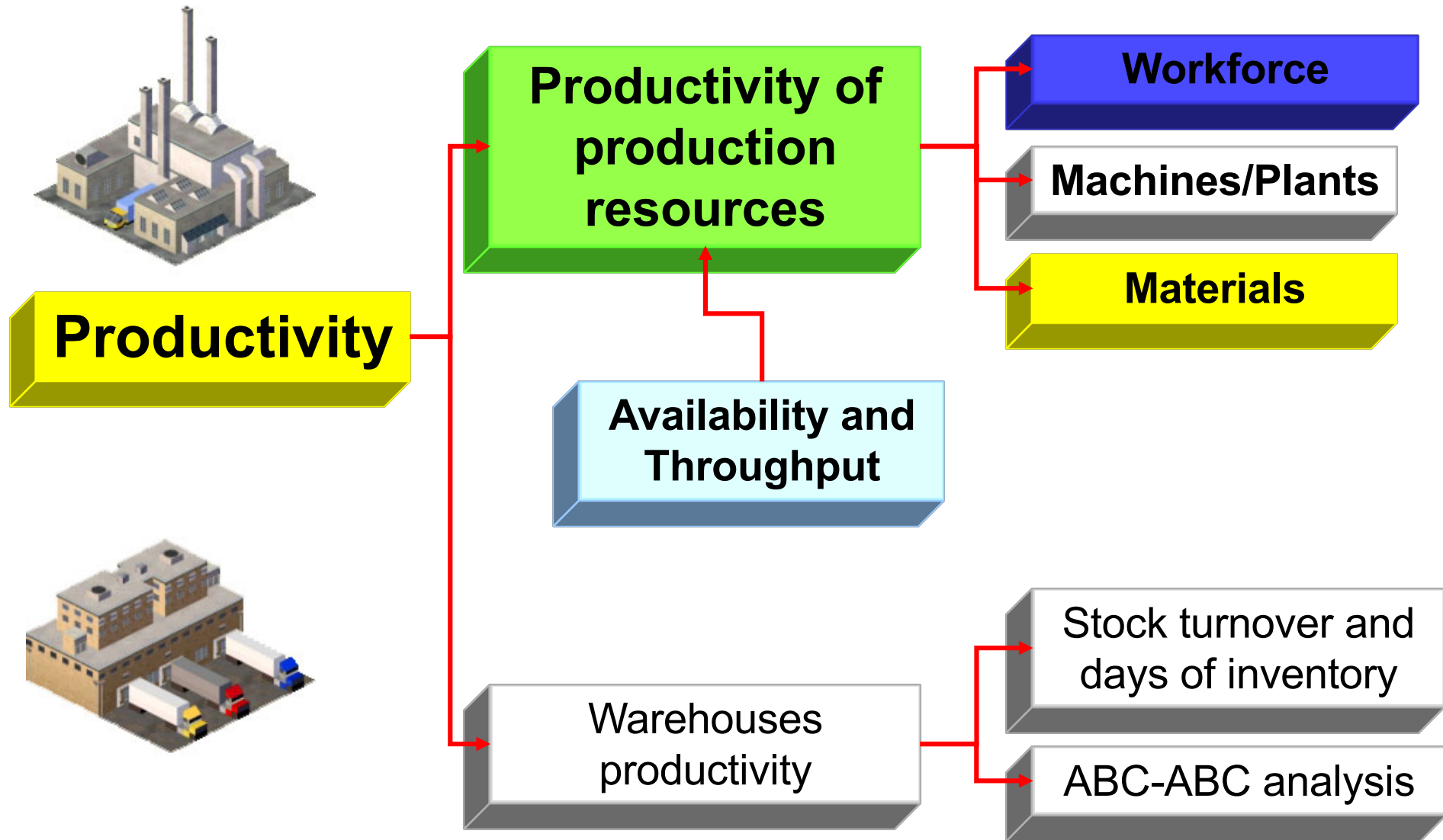


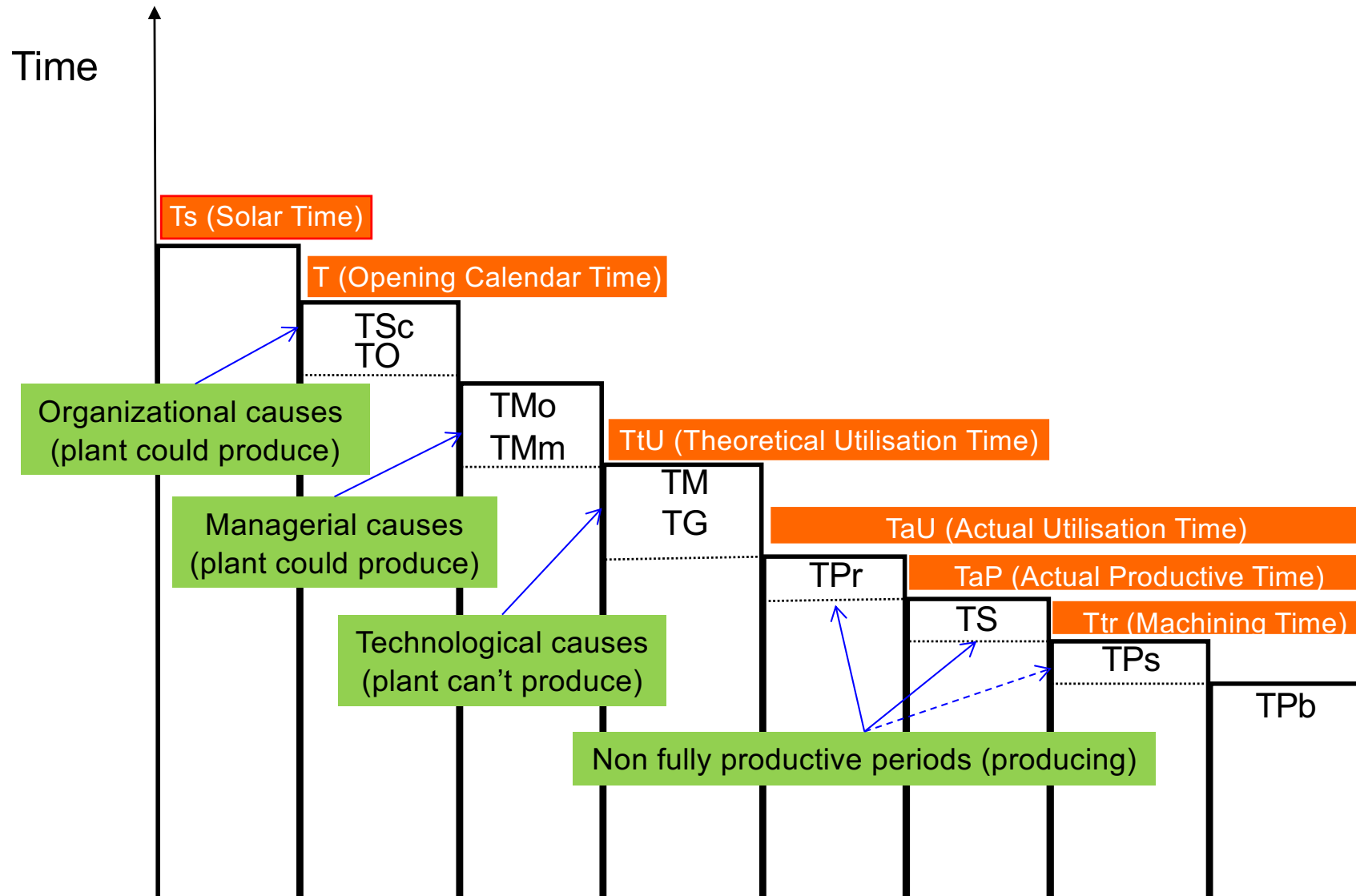
Performance

Rossella Pozzi
School of Industrial Engineering

Productivity performance



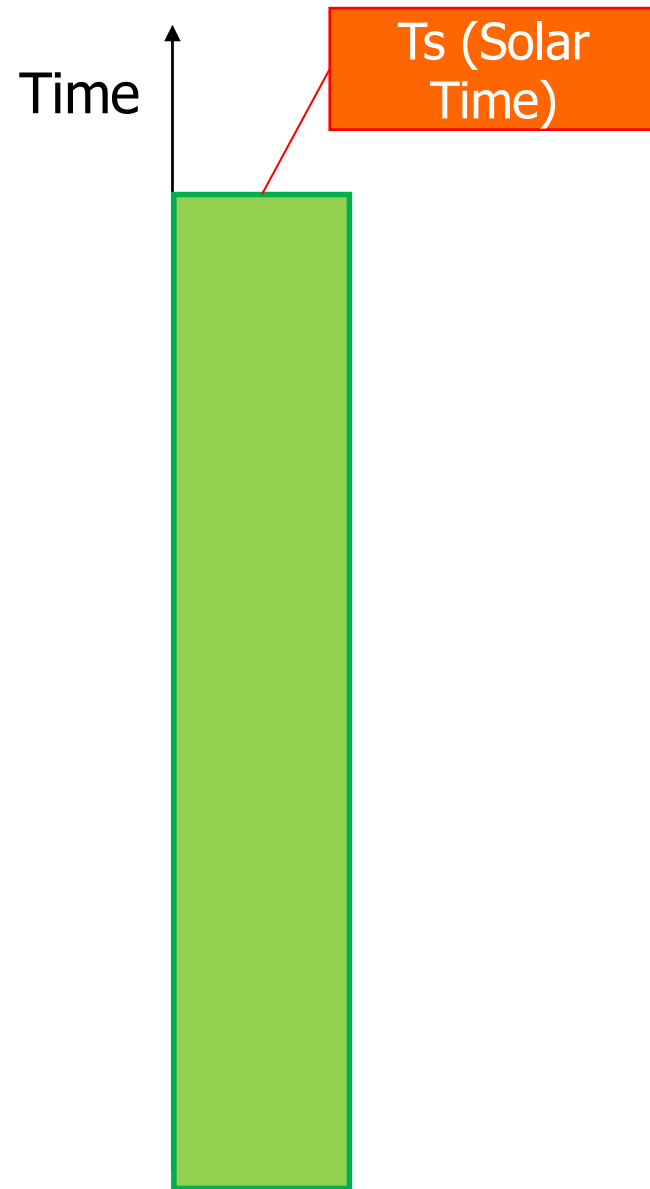
The reference framework for internal performance



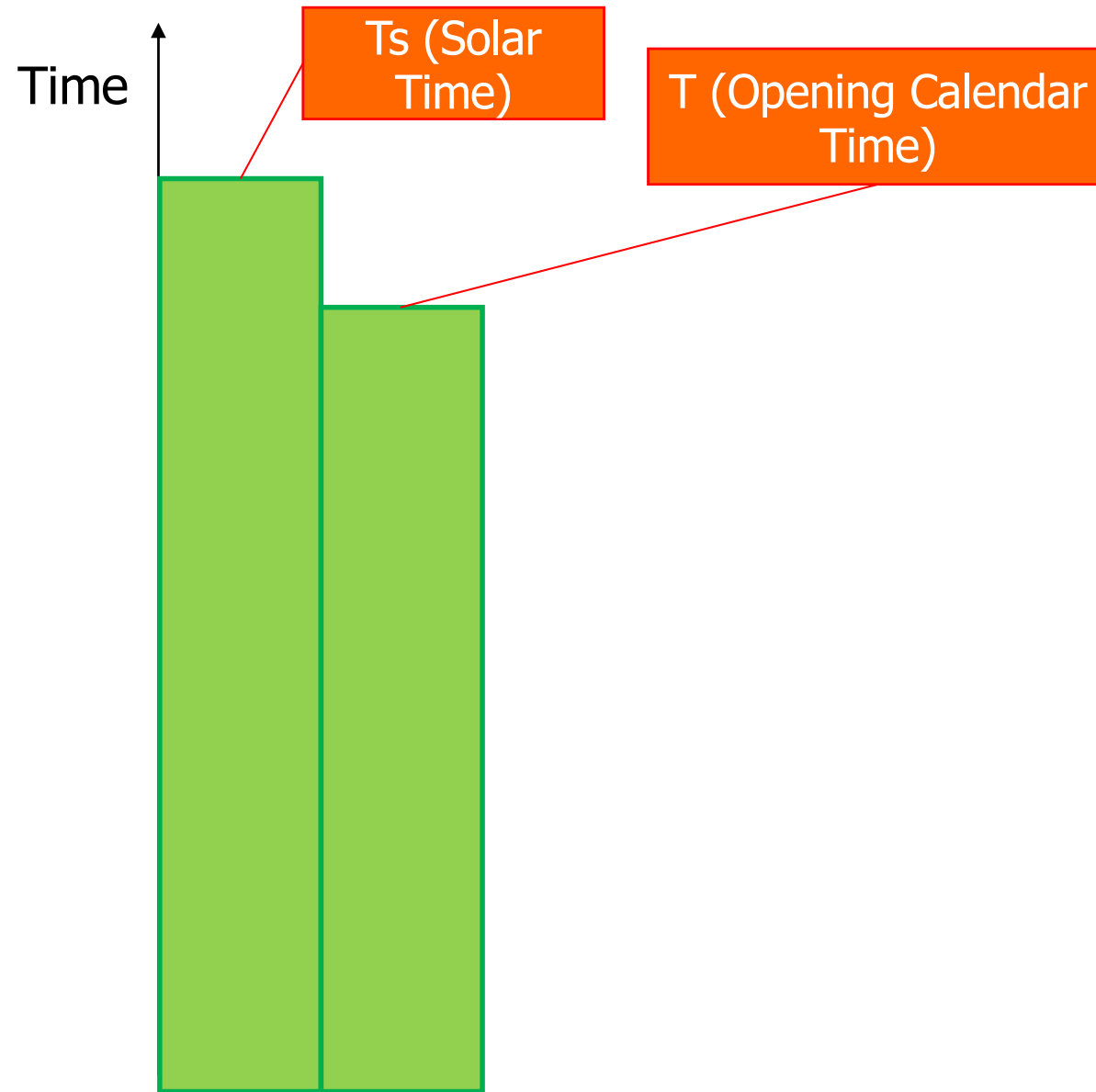
The states of a plant (a machine or in general a productive resource)

- T_s solar time
- T opening (calendar) time (potentially productive)
- T_{Sc} strikes
- T_O organizational causes
- T_{Mo} idle time due to lack of orders
- T_{Mm} idle time due to lack of materials
- T_M idle time due to maintenance
- T_G idle time due to breakdown
- T_{Pr} time for tests (and trials)
- T_S time of setup
- T_{Ps} time of waste (non-compliant) production
- T_{Pb} time of good (compliant) production

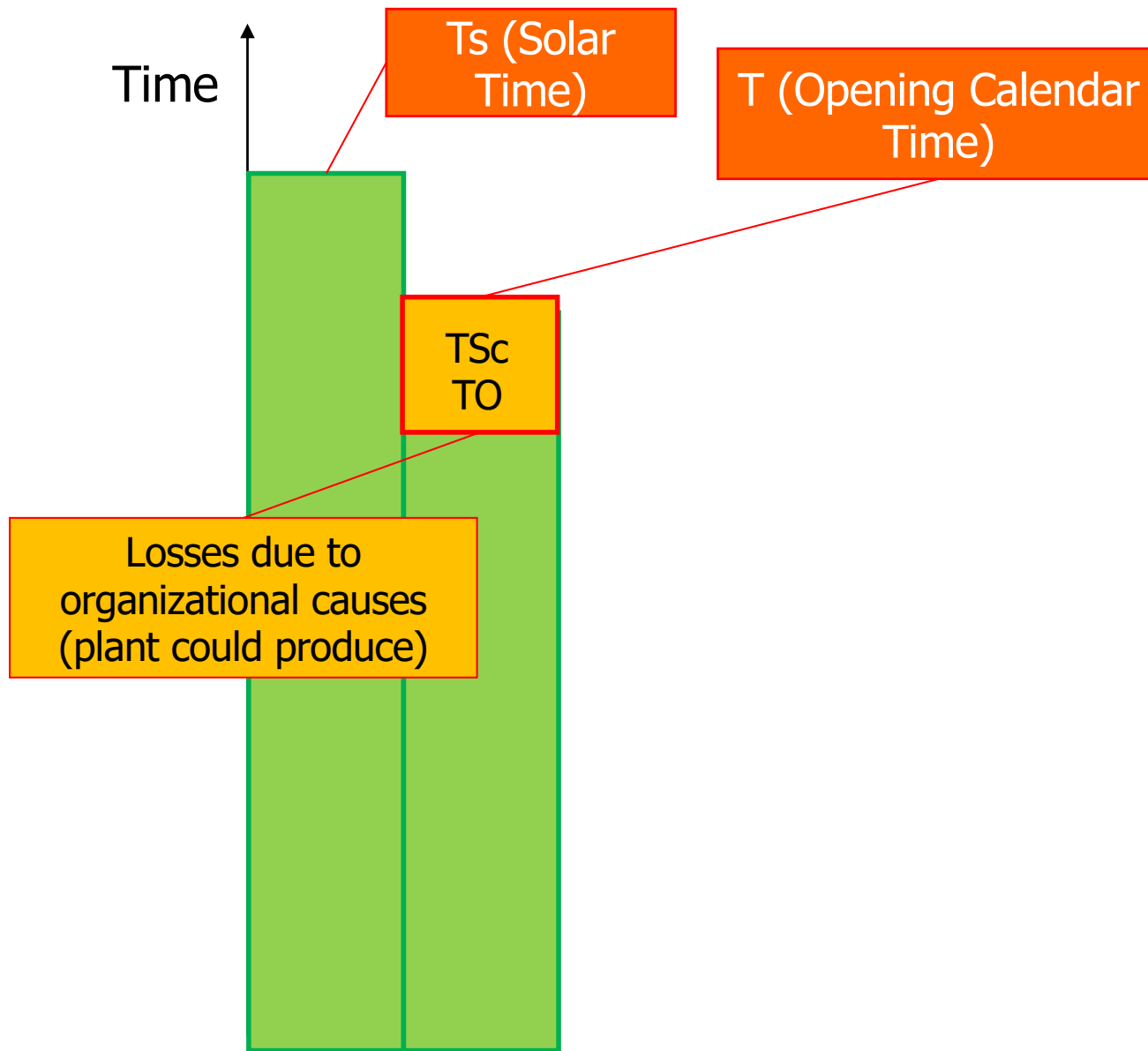
Measuring the internal performances



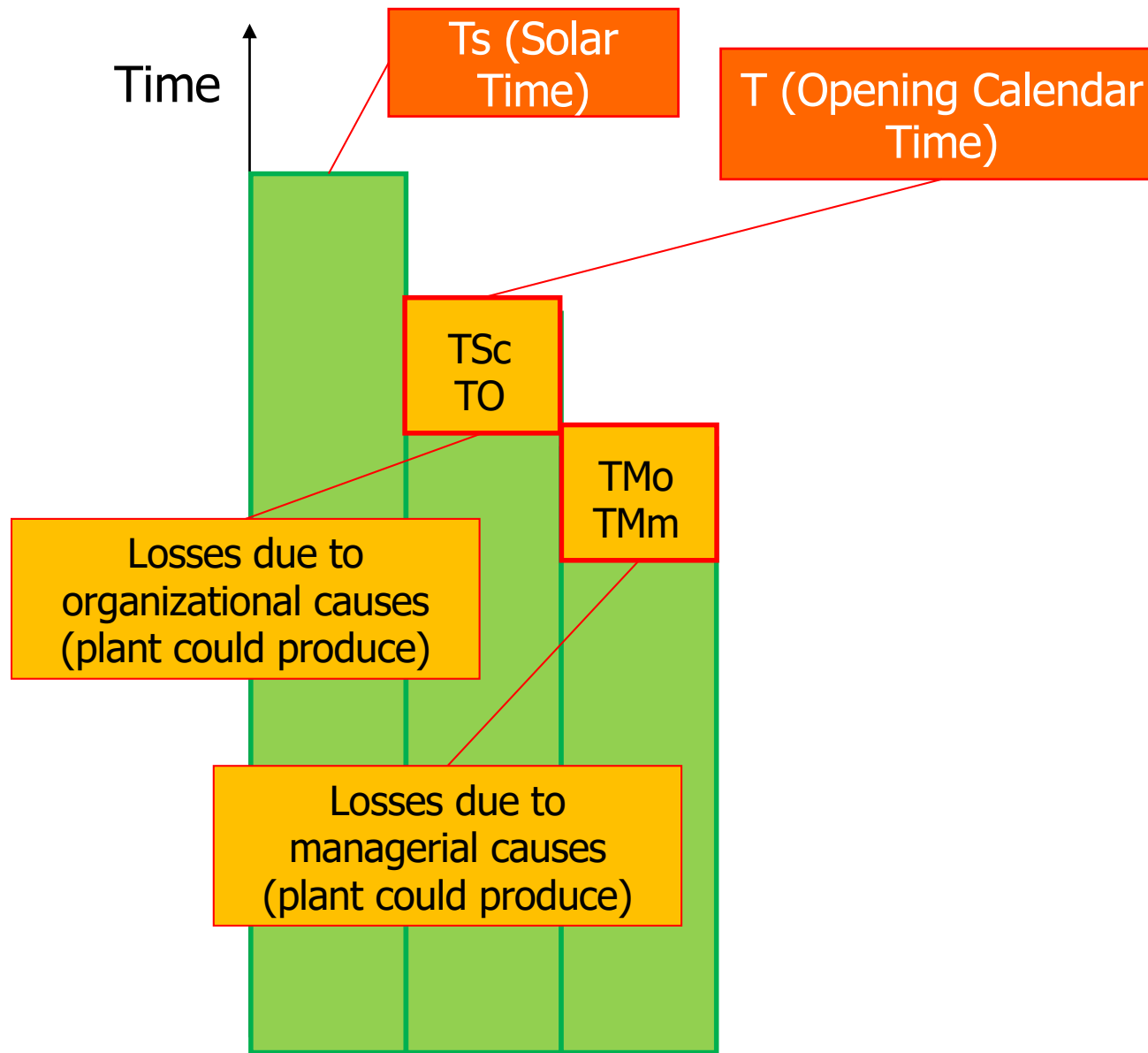
Measuring the internal performances



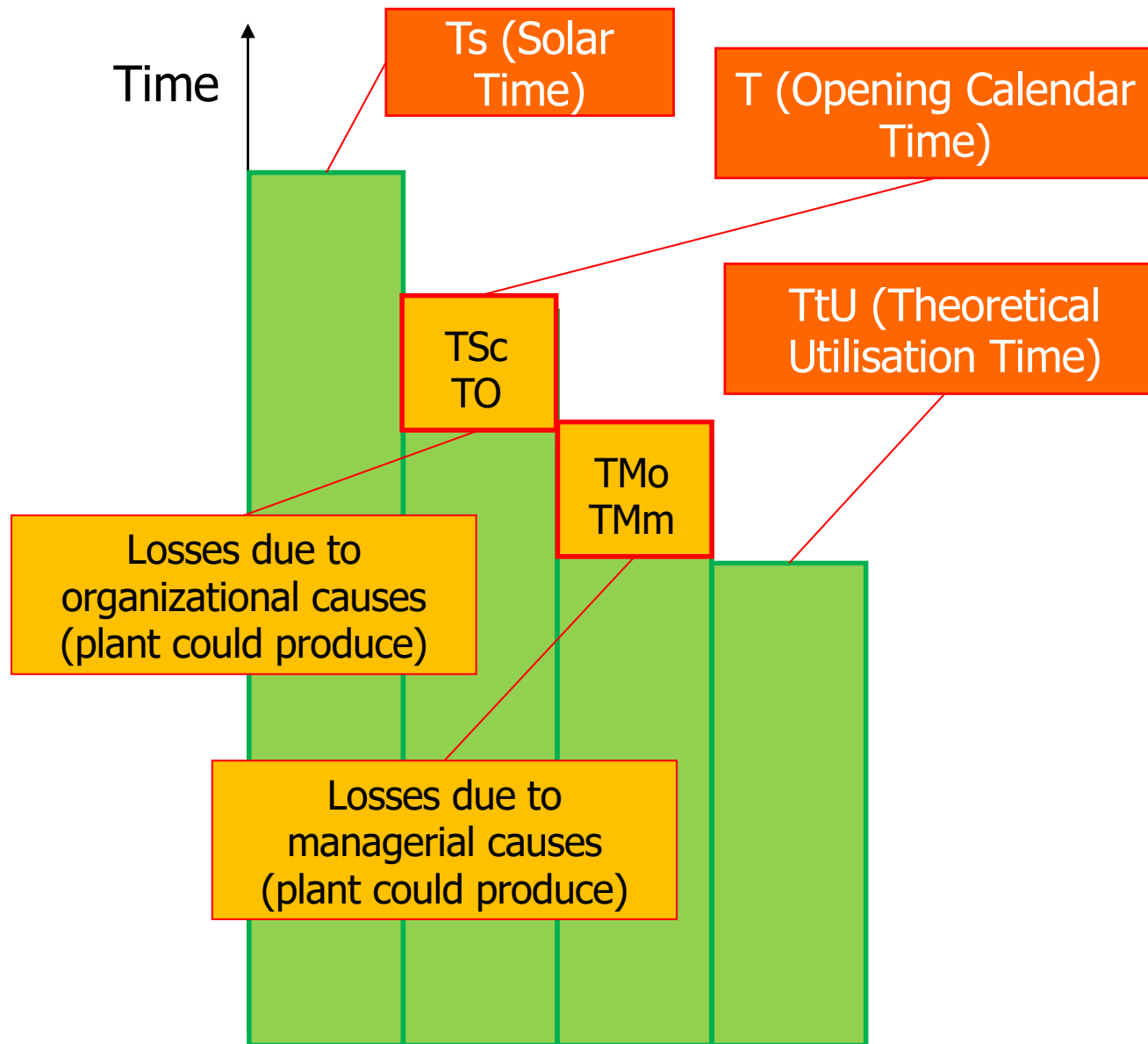
Measuring the internal performances



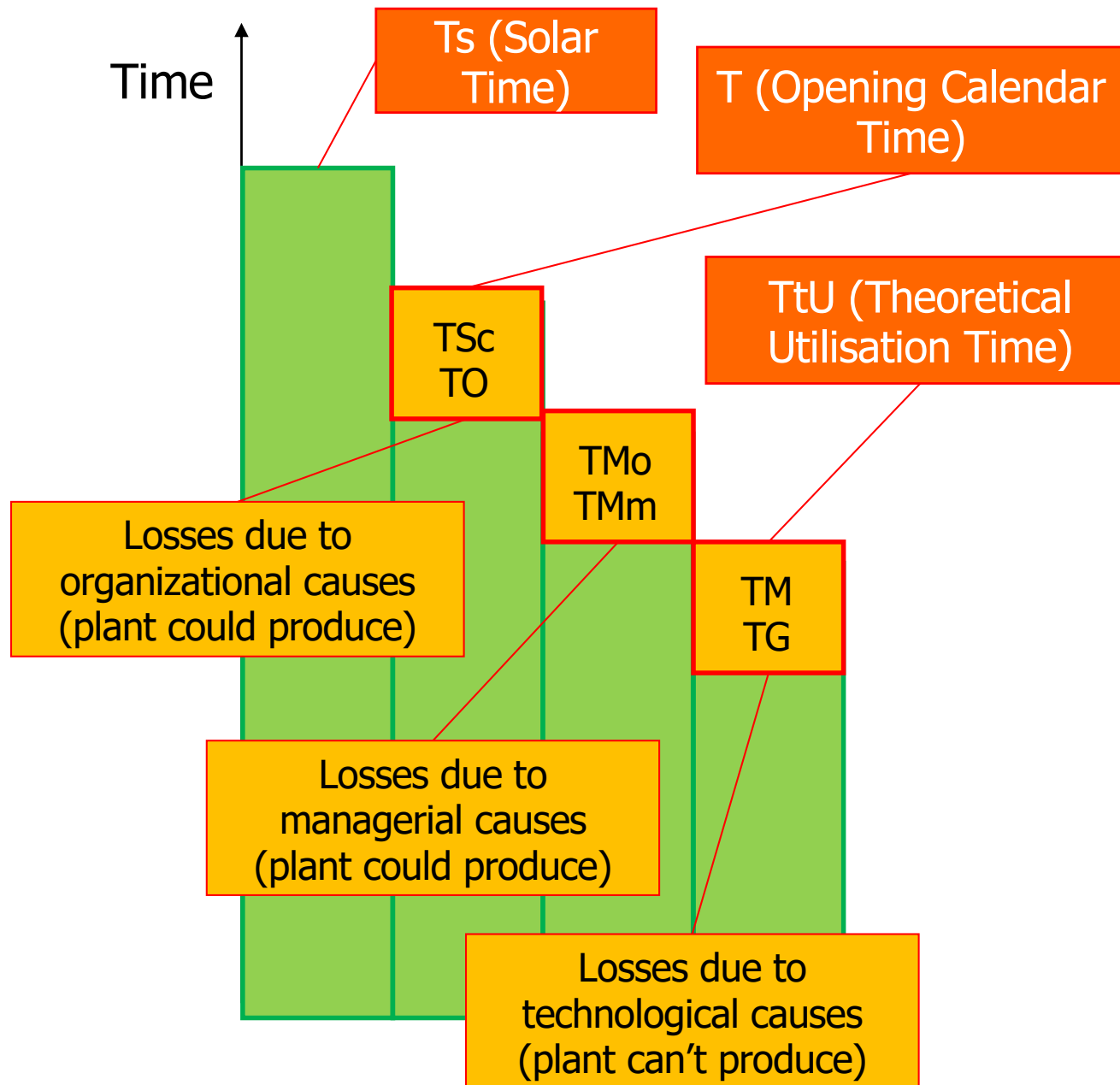
Measuring the internal performances



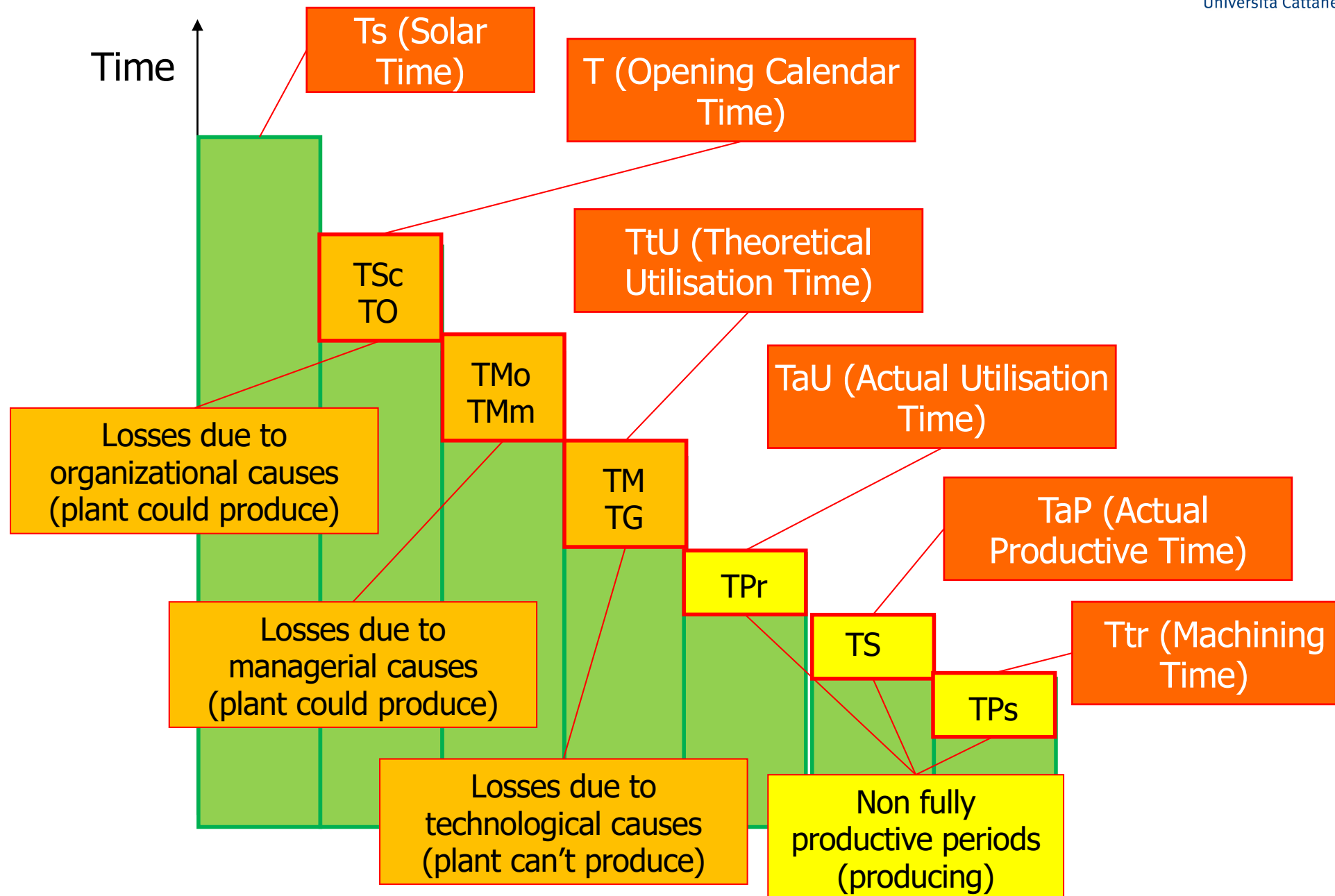
Measuring the internal performances



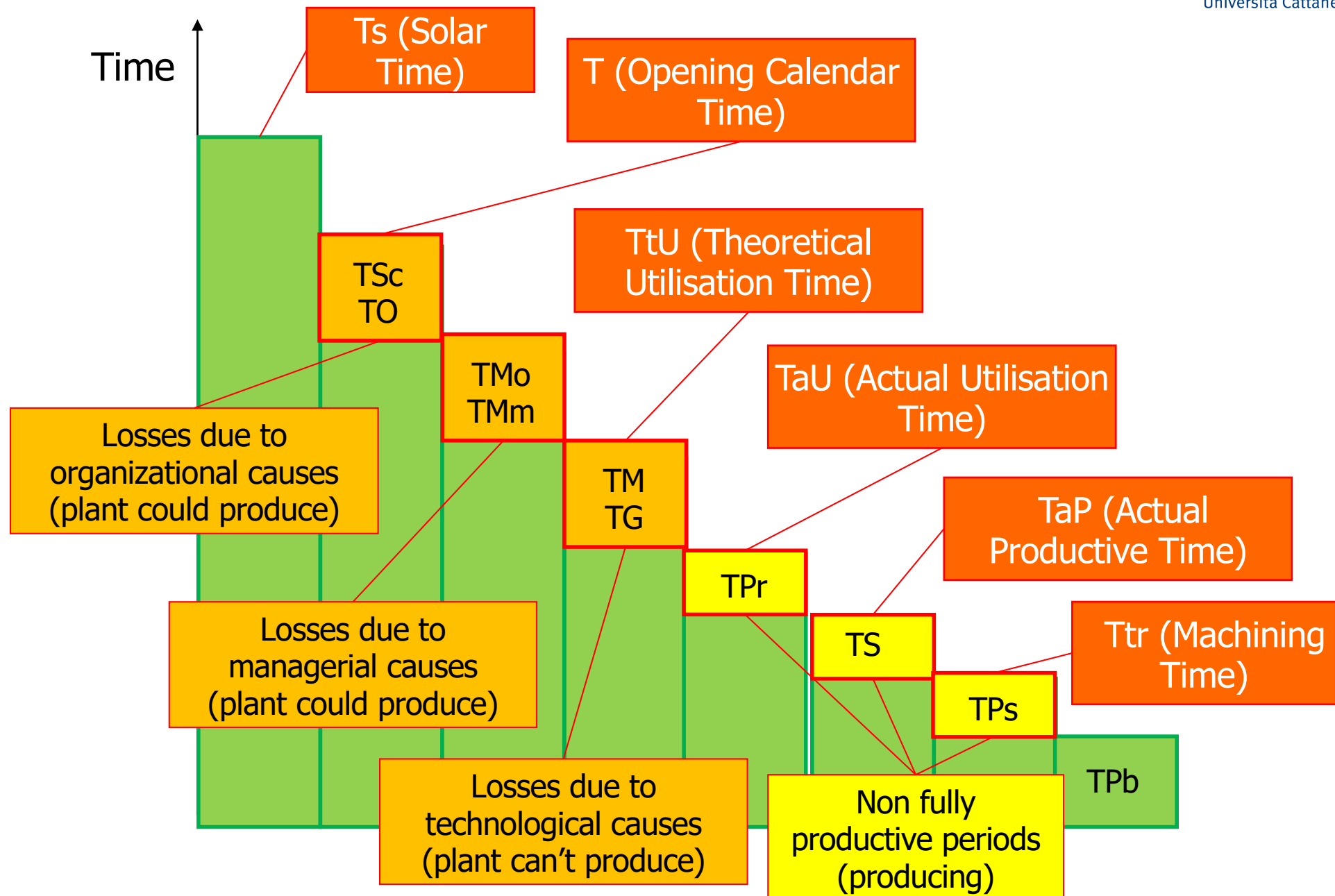
Measuring the internal performances



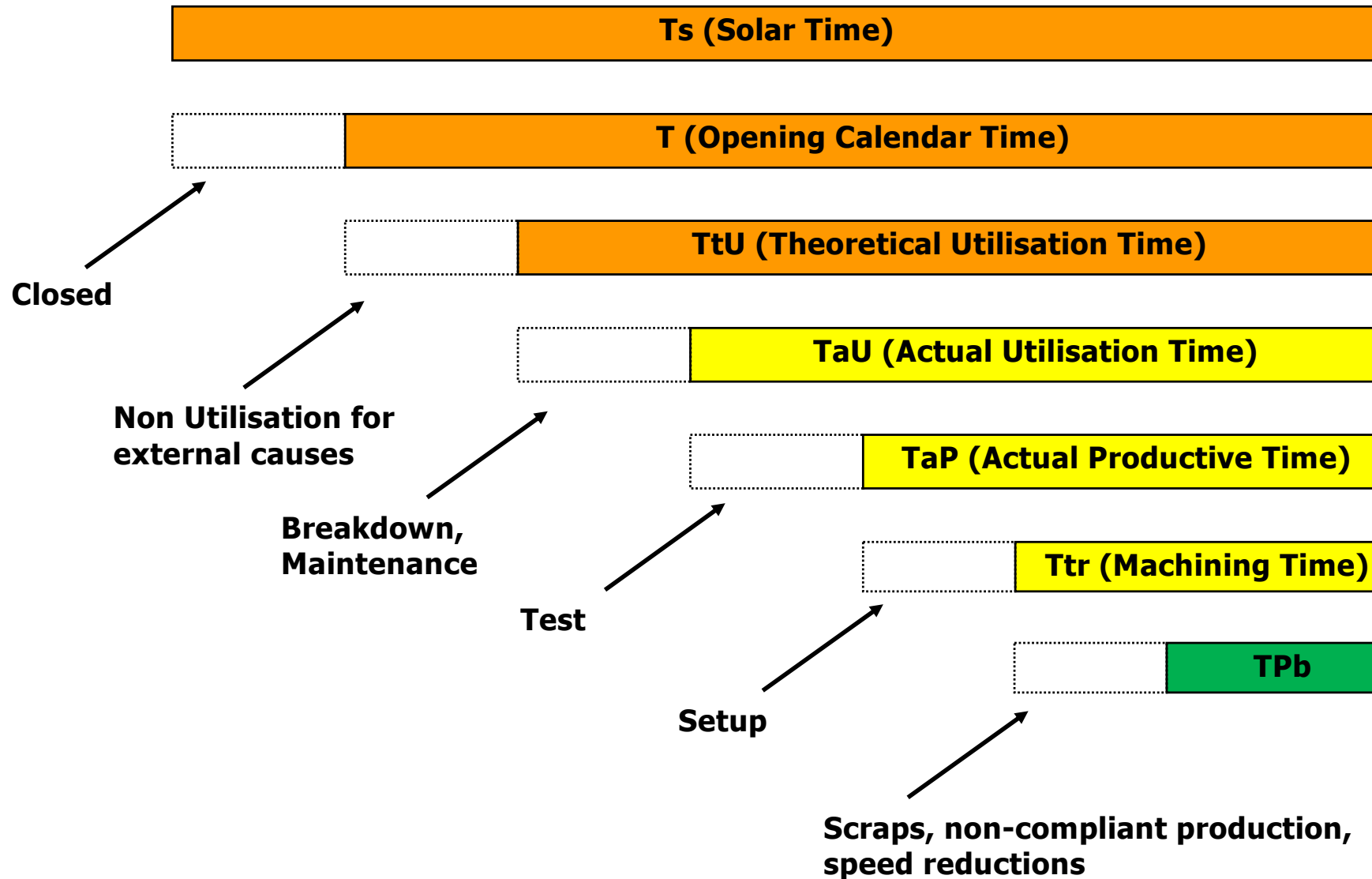
Measuring the internal performances



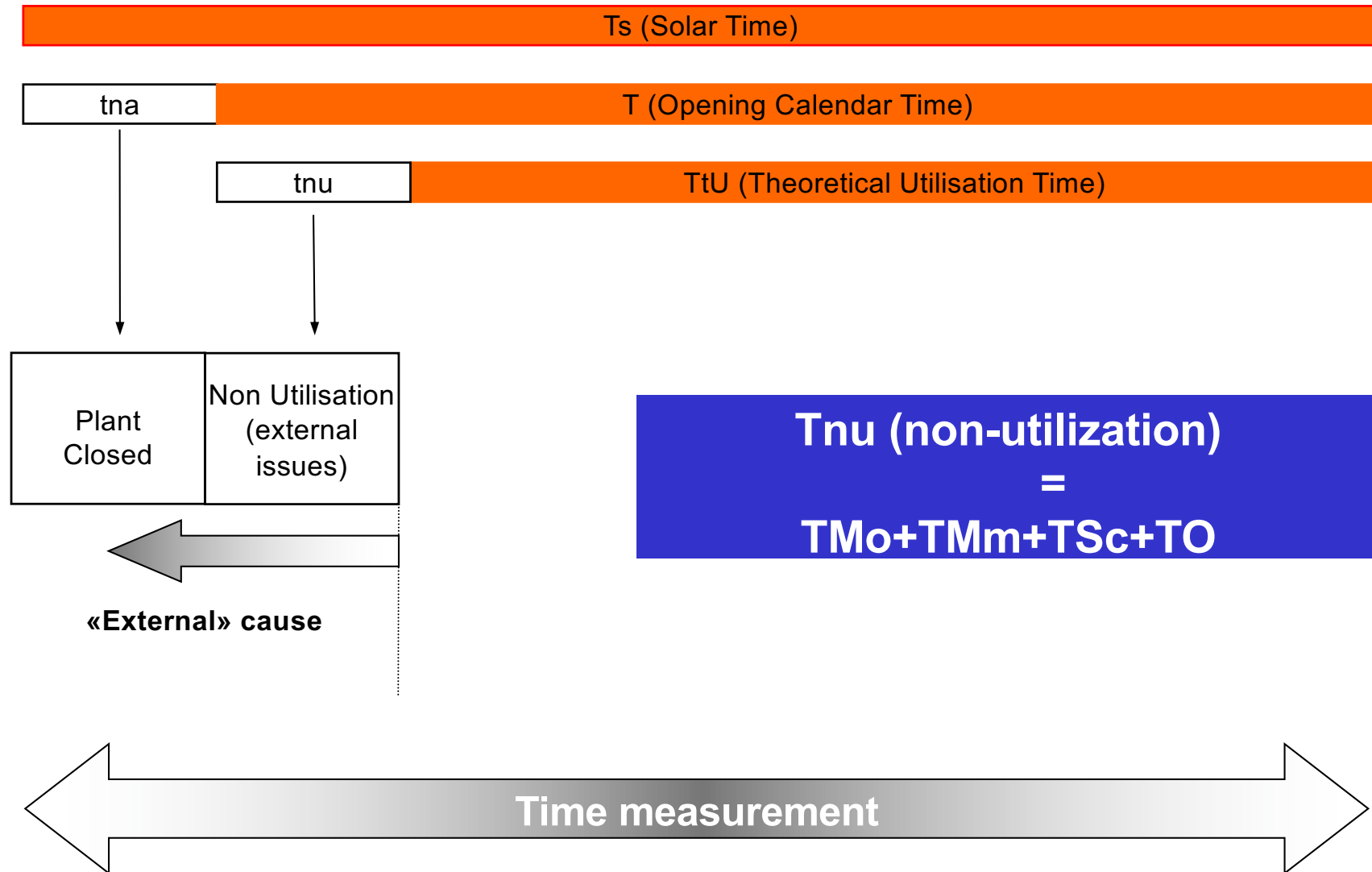
Measuring the internal performances



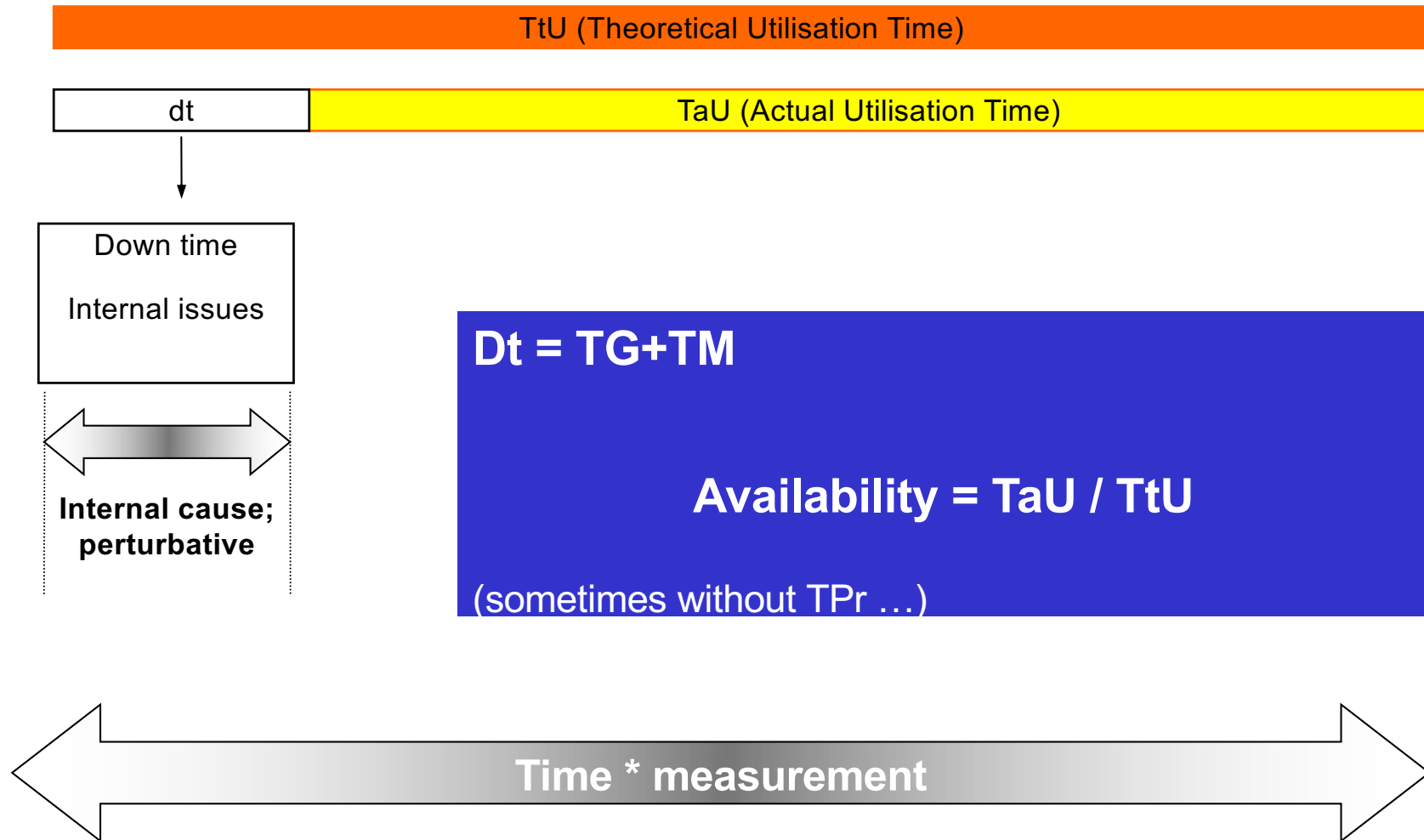
Measuring the internal performances



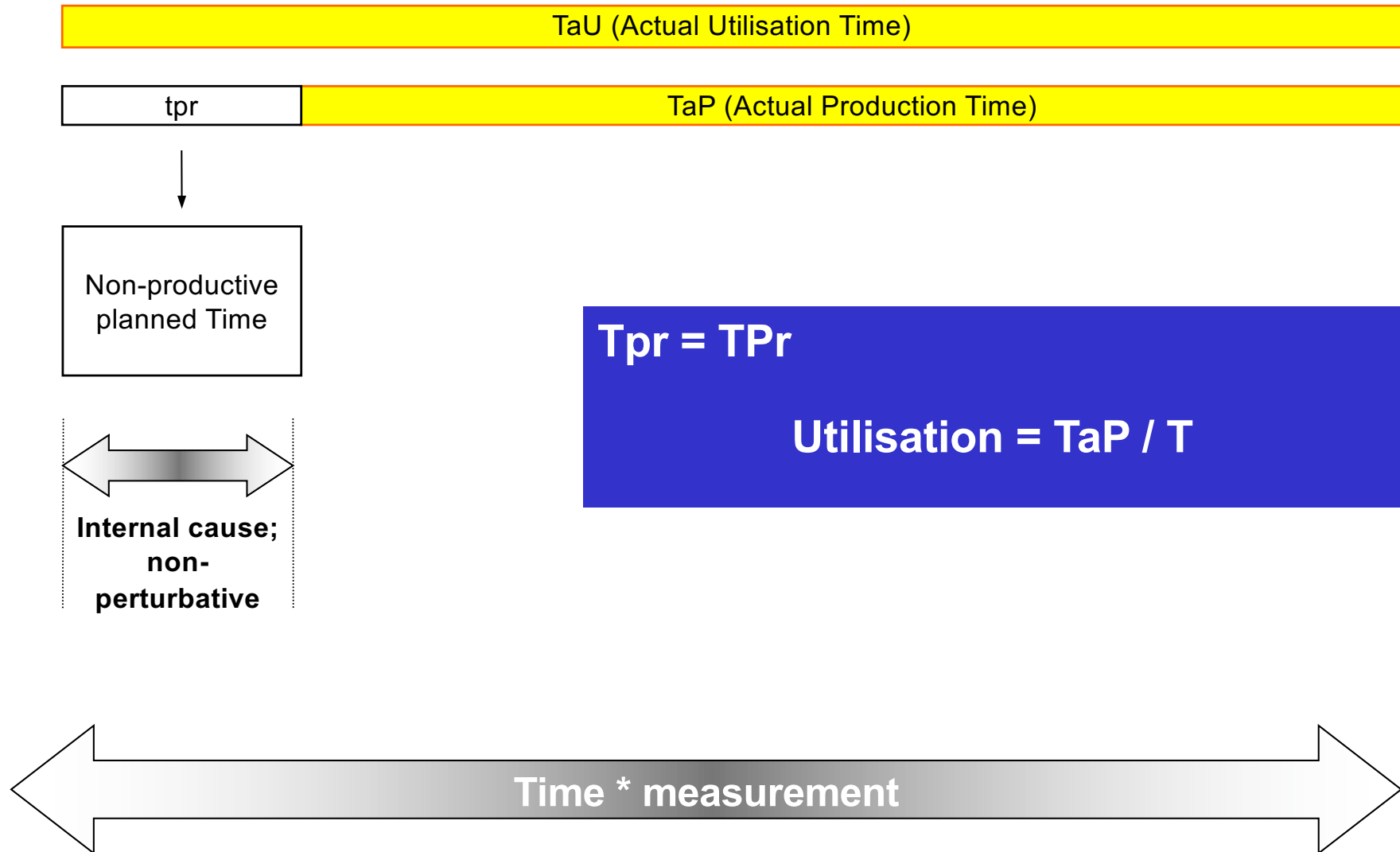
External causes



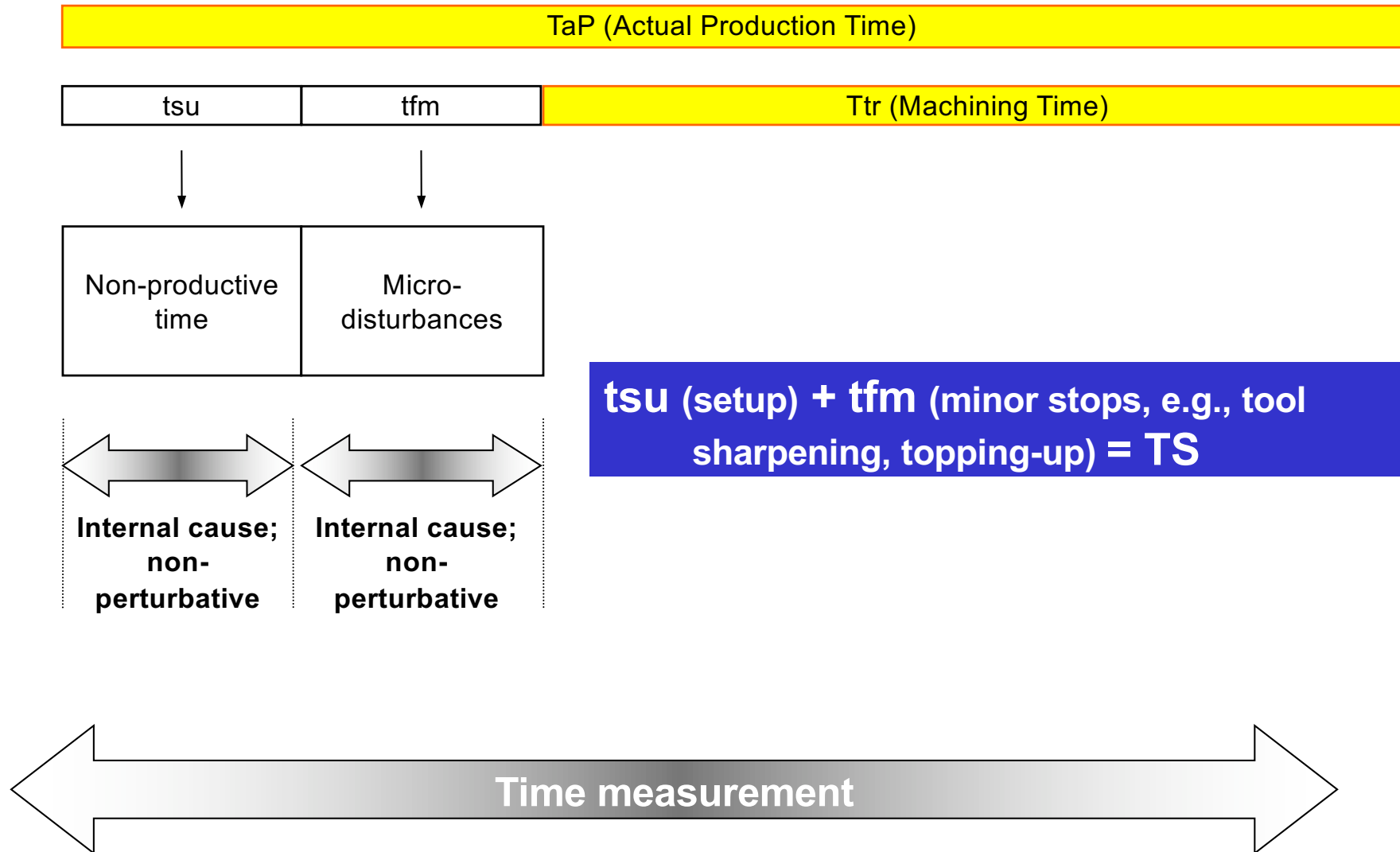
Availability



Utilisation and Tests



Setup



Performance (P), Yield (Y) and Defectiveness (D)

Ttr (Machining Time)
(Produced* units)

Non Compliant (Scrap) Production Time = TP _s	Compliant (good) Production Time (Saleable units) = TP _b
---------------------------------------------------------	------------------------------------------------------------------------

(Quality) Yield (Y) =
 Saleable Units (good pieces) / Total
 (Produced) Units**

Often:
 Defectiveness (rate) (D) =
 (Non Compliant Units) / Produced Units =
 Waste Units / Produced Units

*(there are many "saturation"
measures!)*

Saturation (S) =

Machining Time (Ttr) /
 Actual Production Time
 (TaP)

In TaP usually T_{Mo} and T_{Mm} are
 considered = 0.

(... and T_{pr} ...)



* Produced or Producible

** Total Pieces = Total Units = Produced Pieces = Produced Units

In the real life, actual performances are often lower than the expected.

This is happening also in production systems:

- an **actual status** (and an actual time registration) of a production system is the collection of what happened in the system;
- a **standard status** (or planned, or expected) of a production system is an a priori definition, based on previous knowledge and experience.

We can have:

- Actual production volume vs. Standard production volume [pieces]
- Actual production time vs. Standard production time [h dedicated in a certain period]
- Actual production rate vs. Standard production rate [pieces produced in a due amount of time]
- ...