Service performance measurement – General framework

Systems working "to Stock" (MTS)

Availability

Stock-out persistency

Service

Delivery Accuracy and Completeness

Systems working "to Order" (MTO, ATO….)

Promptness

Punctuality
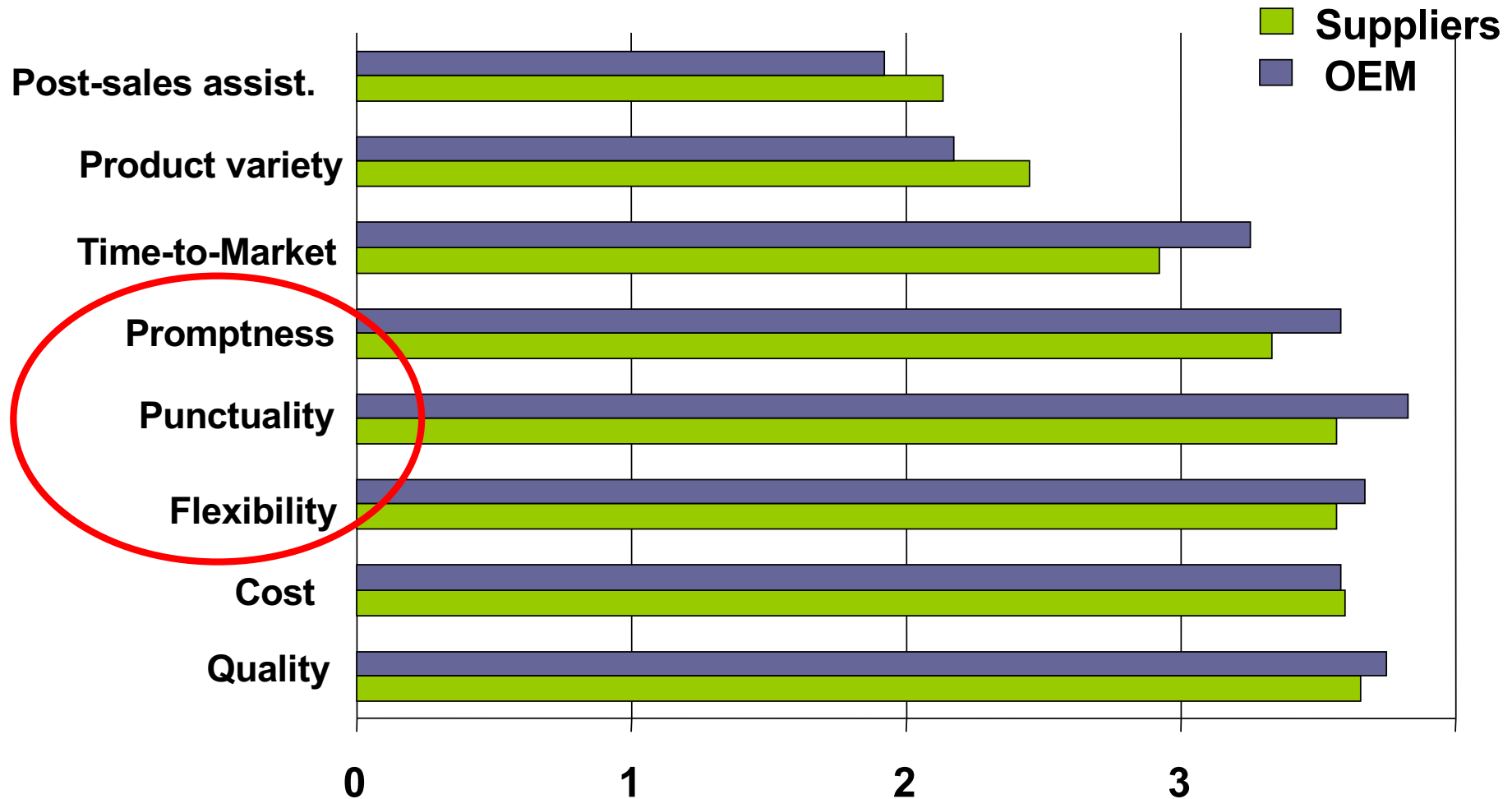
Service performance measurement – General framework

The aim of service performance measurement is to evaluate the "immaterial" performance connected to clients' needs and desires satisfaction.

Examples:

- Timeliness in fulfilling orders
- Punctuality of the delivery
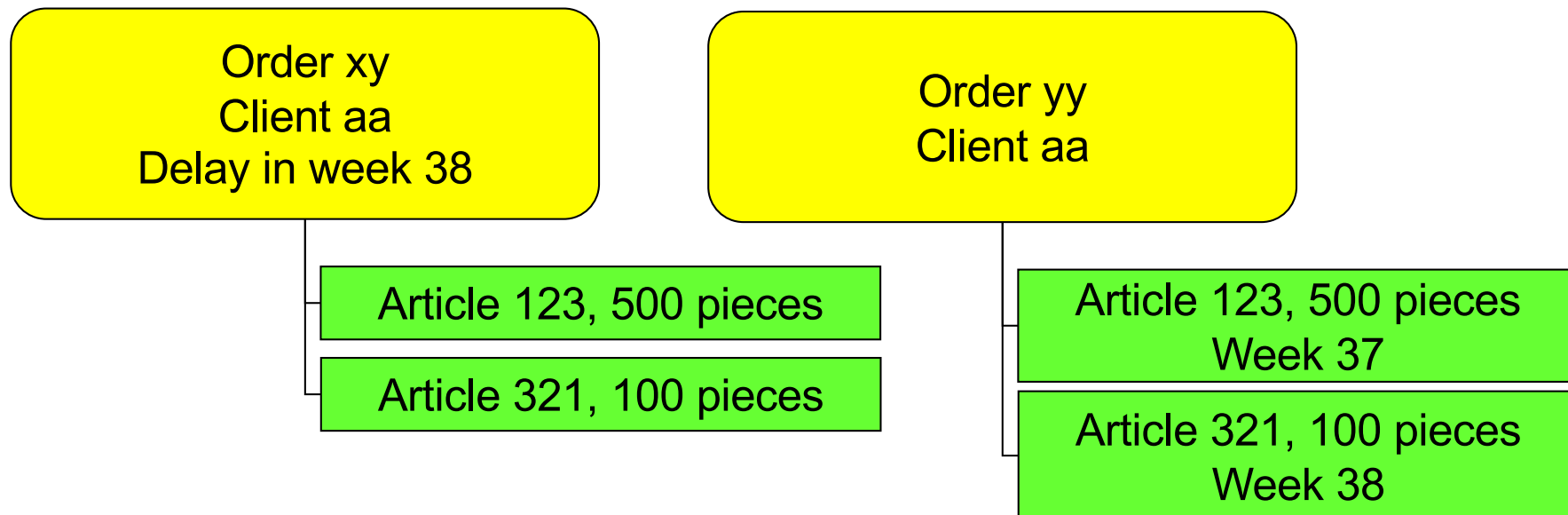- Accuracy of the delivery
- Post-sales assistance
- …

Why service is important: example

Horizontal bar chart comparing Suppliers (green) and OEM (purple) ratings across categories: Post-sales assist., Product variety, Time-to-Market, Promptness, Punctuality, Flexibility, Cost, Quality. X-axis from 0 to 3. Promptness, Punctuality, and Flexibility are circled in red.

For a sample of firms in the household appliance sector, service performance are as much important as quality and price.

General considerations

In a firm service performance measurements should be defined accordingly to what is assumed to be the "service for the client":

- A complete *Order* or a single *Order Line/Row*
- Acceptable time *delays*

Order xy Client aa Delay in week 38	Order yy Client aa
Article 123, 500 pieces	Article 123, 500 pieces Week 37
Article 321, 100 pieces	Article 321, 100 pieces Week 38

ROSSO   BIANCHI   S.p.A

Milan, 25-11-2014

Dear   GIALLO VERDI s.r.l.

Order n. 548/zz

Article aaa …… …...n° 3 pieces
Article bbb …… …...n° 7 pieces
Article ccc …… …...n° 9 pieces

Terms for delivery: . . . .
Place of delivery: …………….
Payments terms: . . . .

ORDER ROWS or ORDER LINES

Service performance measurement – Accuracy (or Precision)

It evaluates the quality of the system of order preparation
(ref. wrong items sent)

The following indicators are used:

- **Physical**:
  - N° mistakes in the delivery / N° Orders (Order lines) managed
  - N° returns due to delivery mistakes

- **Economic**:
  - Cost of the penalty for inaccurate delivery
  - Cost of management and accounting activities duplication

The delivery mistakes can be of packaging, items, batches, etc…

Service performance measurement – Completeness

It evaluates the reduction in the level of service perceived by customers in terms of splitting of order fulfillment.

The following indicators are used:

- Physical:
  - N° of order rows fulfilled with the first delivery / N° total rows
  - Average N° of deliveries for each order

- Economic:
  - Value of order rows fulfilled with the first delivery / Total value of rows
  - Cost of fractioned deliveries.

Service performance measurement MTS – Availability (ref. stock-out)

It takes into account the phenomenon of the stock-out.

Indicators:

- **Physical**:
  - N° items in stock-out / N° total items
  - N° order filled / N° total orders
  - N° order lines filled / N° total order lines
  - N° codes filled / N° codes requested

- **Economic**:
  - Cost of the lost margin* due to the stock-out (if not recoverable)
  - Cost of the penalty for delayed delivery (if any contractual clause considers and "back-log" concept takes place)
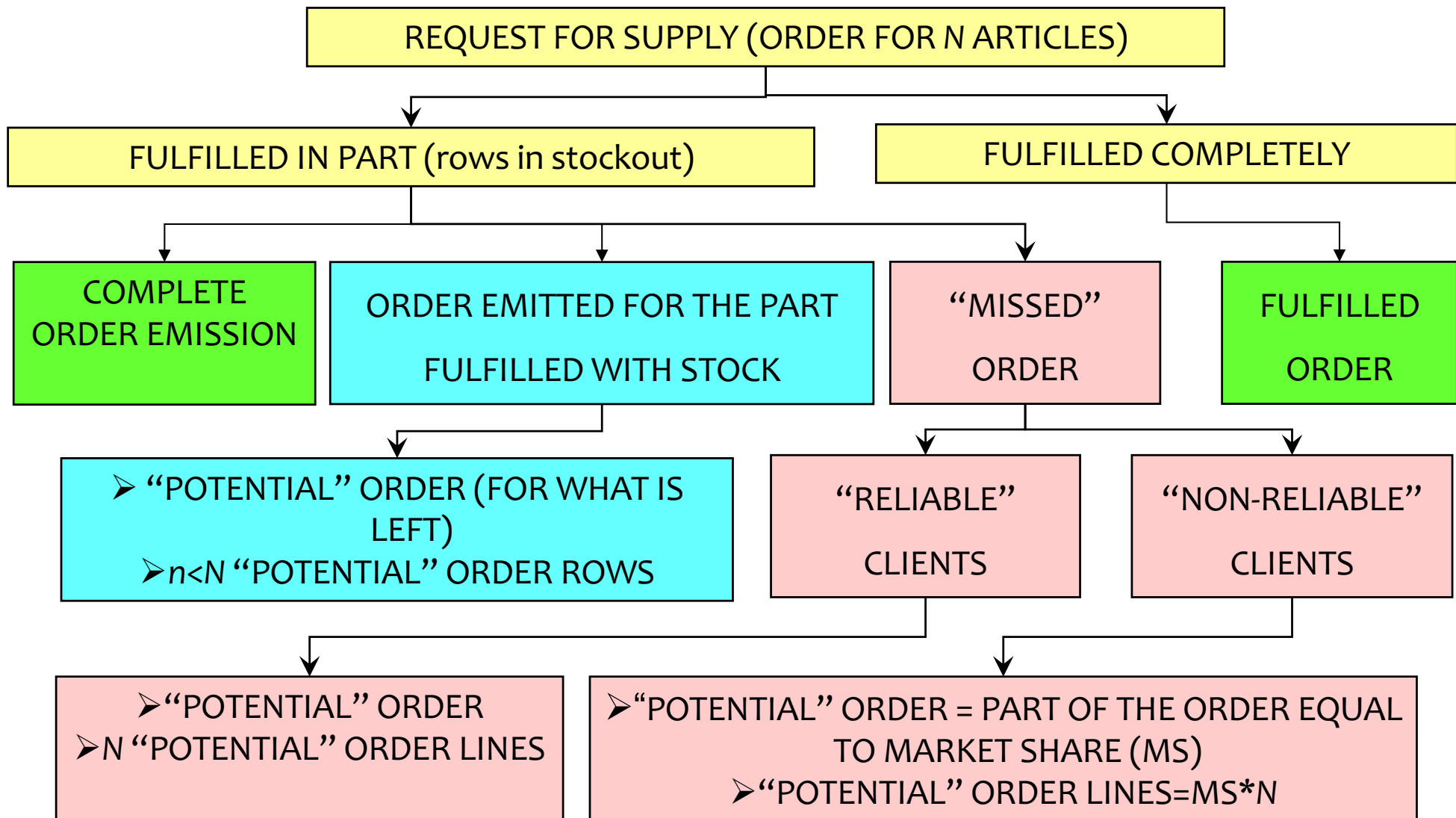 - Cost of the loss of reputation …

Service performance measurement MTS – Stock out persistency (product unavailability)

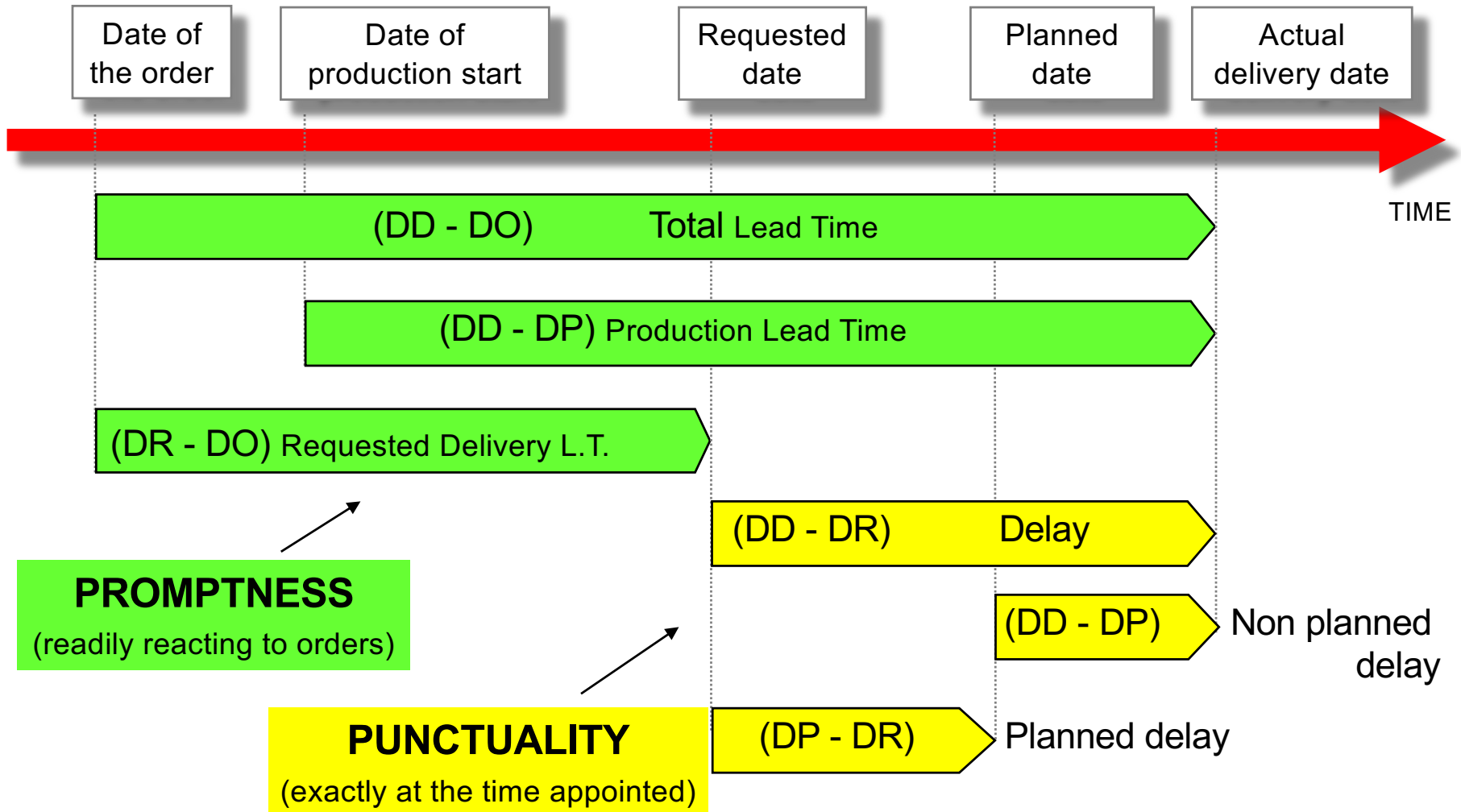It measures the "going on of the stock-out issue".

- **Physical**:
  - Average time of delivery of the orders delivered not "off-the-shelf"
  - N° periods in stock-out / N° total periods.

We should evaluate both the "actual" stock-out and the "potential" stock-out, especially in those situations in which it is actually difficult to control the real stock-out occurrence (e.g., the good is not available on the shelf)

The "potential" orders

REQUEST FOR SUPPLY (ORDER FOR *N* ARTICLES)

FULFILLED IN PART (rows in stockout)

FULFILLED COMPLETELY

COMPLETE ORDER EMISSION

ORDER EMITTED FOR THE PART

FULFILLED WITH STOCK

"MISSED"

ORDER

FULFILLED

ORDER

- ➢ "POTENTIAL" ORDER (FOR WHAT IS LEFT)
- ➢ $n<N$ "POTENTIAL" ORDER ROWS

"RELIABLE"

CLIENTS

"NON-RELIABLE"

CLIENTS

- ➢ "POTENTIAL" ORDER
- ➢ N "POTENTIAL" ORDER LINES

- ➢ "POTENTIAL" ORDER = PART OF THE ORDER EQUAL TO MARKET SHARE (*MS*)
- ➢ "POTENTIAL" ORDER LINES=$MS*N$

Service performance measurement – Performance related to LT: promptness and punctuality

Date of the order | Date of production start | Requested date | Planned date | Actual delivery date

TIME

(DD - DO)   Total Lead Time

(DD - DP) Production Lead Time

(DR - DO) Requested Delivery L.T.

(DD - DR)   Delay

(DD - DP)   Non planned delay

PROMPTNESS
(readily reacting to orders)

PUNCTUALITY
(exactly at the time appointed)

(DP - DR)   Planned delay

81

The measure of promptness

It measures the responsiveness of the system, by observing the time elapsed between the date of the emission of the order and the date of the shipment / delivery of the goods to the client.

- ▪ Physical:
  - Σ (Delivery Date – Order date) / N° tot orders
  - Σ (Date of full delivery – Order date) / N° tot orders
  - N° orders filled within "x" days / N° total orders
  - N° lines filled within "x" days / N° total lines

The measure of punctuality

It measures the capability of the system to respect the date requested (or agreed) with the client.

It is the time elapsed from the date requested (or agreed, depending on the client perspective).

- Physical:
  - Number of orders / number of late order lines (absolute, relative)
  - Average delay (measured for all the orders; or only for those that are late)

- Economic:
  - Penalty cost
  - Cost of administrative and management activities duplication

Taking as reference base the orders whose delivery has been promised in the reference period:
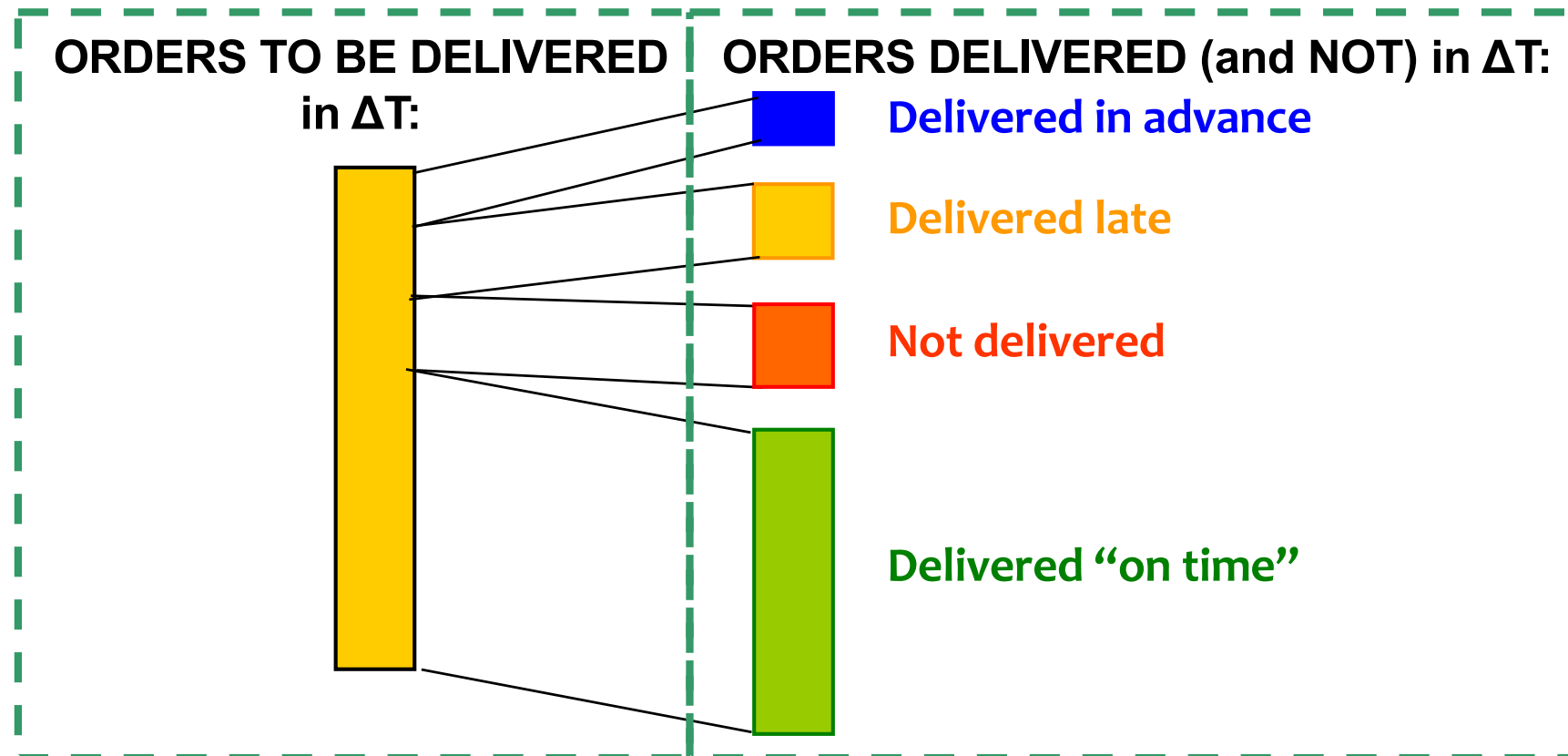
ORDERS TO BE DELIVERED in ΔT:

ORDERS DELIVERED (and NOT) in ΔT:

Delivered in advance

Delivered late

Not delivered

Delivered "on time"

Delivery punctuality- performance calculated with respect to the orders to deliver in a certain period

$$\% \text{ orders delivered "on time"} = \frac{\# \text{ orders delivered "on time"}}{\text{Tot orders to deliver in the period}} * 100$$

$$\% \text{ orders delivered late} = \frac{\# \text{ orders delivered late}}{\text{Tot orders to deliver in the period}} * 100$$

$$\% \text{ orders delivered in advance} = \frac{\# \text{ orders delivered in advance}}{\text{Tot orders to deliver in the period}} * 100$$

$$\% \text{ orders not delivered} = \frac{\# \text{ orders not delivered}}{\text{Tot orders to deliver in the period}} * 100$$

Delivery punctuality - performance calculated with respect to the orders to deliver in a certain period

Average delay of the orders delivered late = $\dfrac{\sum_i (\text{\# orders delivered late of } i \text{ units of time}) * i}{\text{\# orders delivered late}}$

Average advance of the orders delivered in advance = $\dfrac{\sum_i (\text{\# orders delivered in advance of } i \text{ units of time}) * i}{\text{\# orders delivered in advance}}$

Quality performance measurement – In House Compliance

Cf. materials productivity (e.g., shavings, off-cuts, wastes, scraps, rejects)

More focused indicators can be defined:

- Physical
  - Number of reworks
  - % of reworks on the total of production cycles
  - Time spent in reworks

- Economic
  - Cost of reworks

Quality performance measurement –
In Field Compliance

It's a measure of strategic importance in the current competitive context.

Some indicators are:

Physical

- Number of returned products
- Number of interventions under warranty

Economic

- Cost of interventions under warranty
- Cost of loss of reputation (very difficult to estimate)