dcm THE LEARNING EXPERTS

Lean 6 Sigma
5s

Improve

- Sort
- Set in Order
- Shine
- Standardise

CANDO

An acronym developed by **Henry Ford** to make the work area more organized and efficient.

C = Cleaning up
A = Arranging
N = Neatness
D = Discipline
O = Ongoing improvement

- **Sort**
- **Set in Order**
- **Shine**
- **Standardise**

What are the 5's?

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What are the 5’s?

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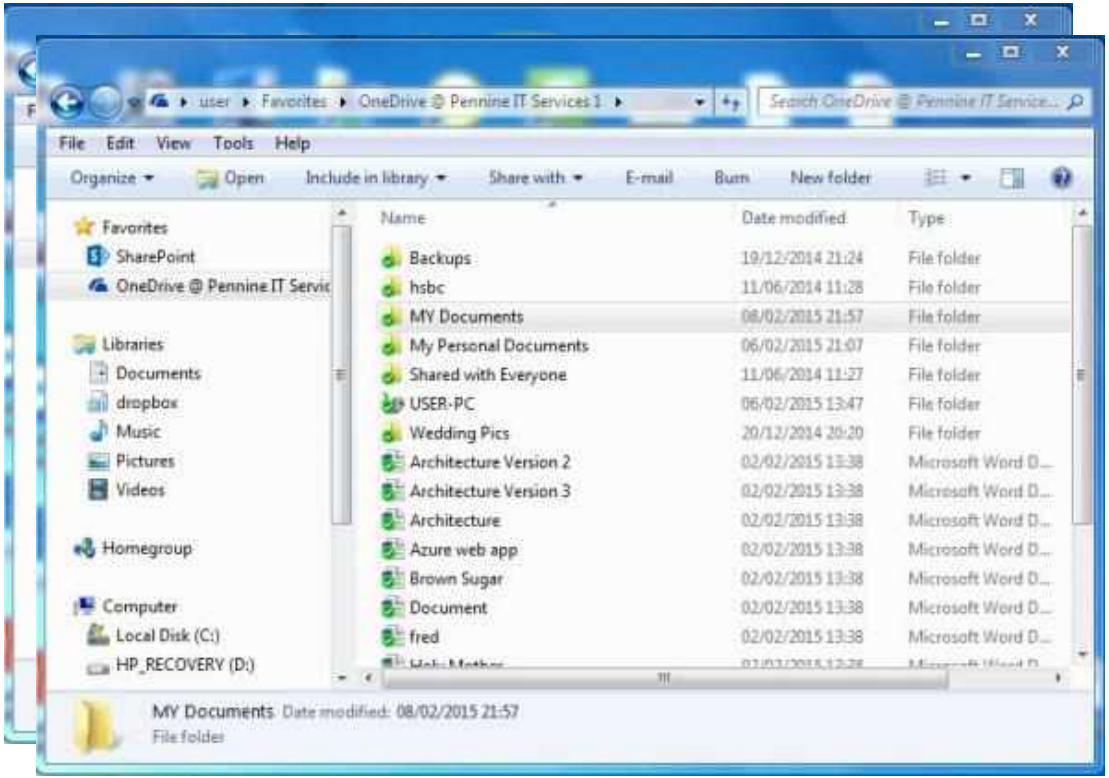

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What are the 5’s?

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Lean Six Sigma SMED

SMED

(Single Minute Exchange of Dies)

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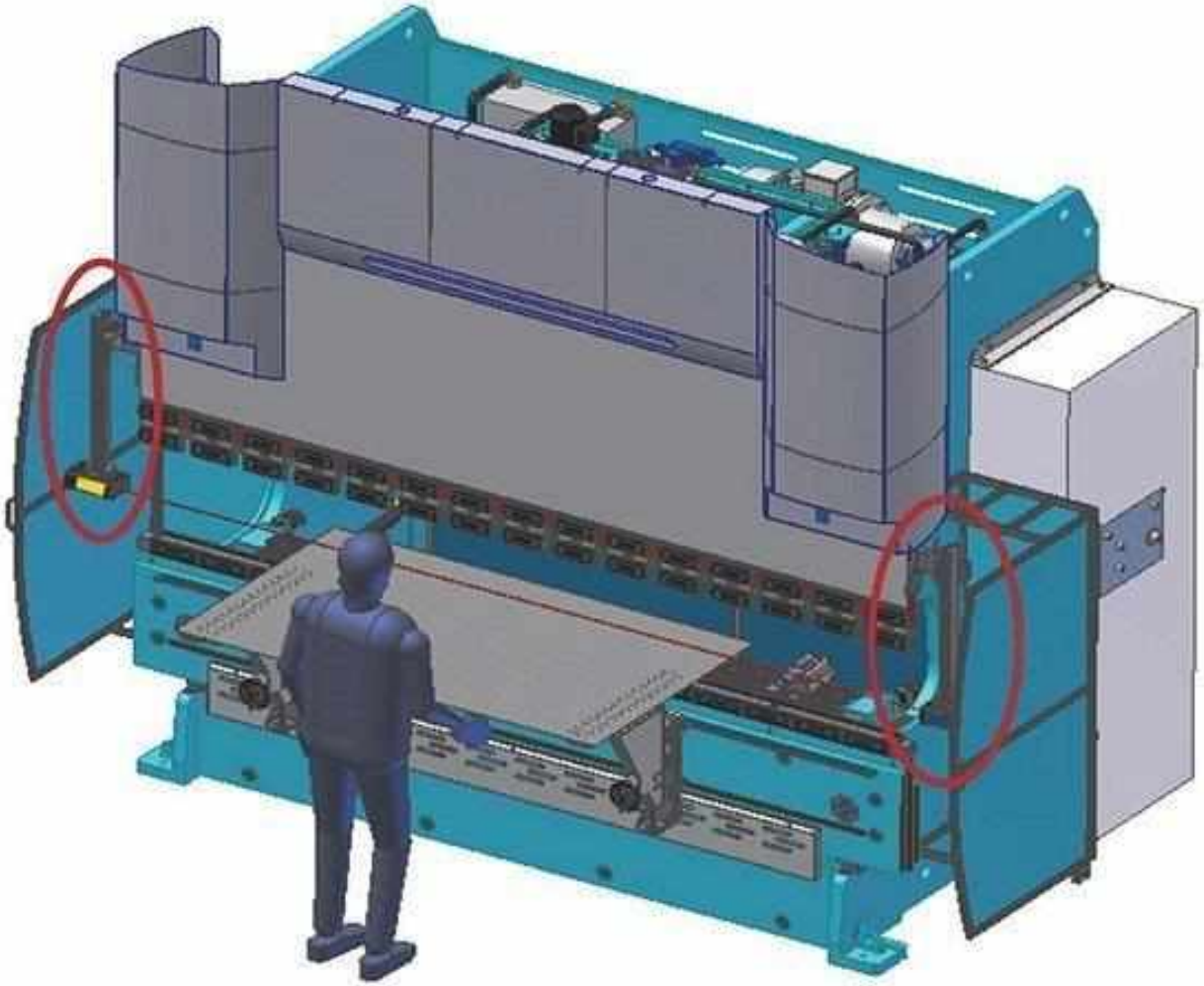

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THE LEARNING EXPERTS

SMED

(Single Minute Exchange of Dies)

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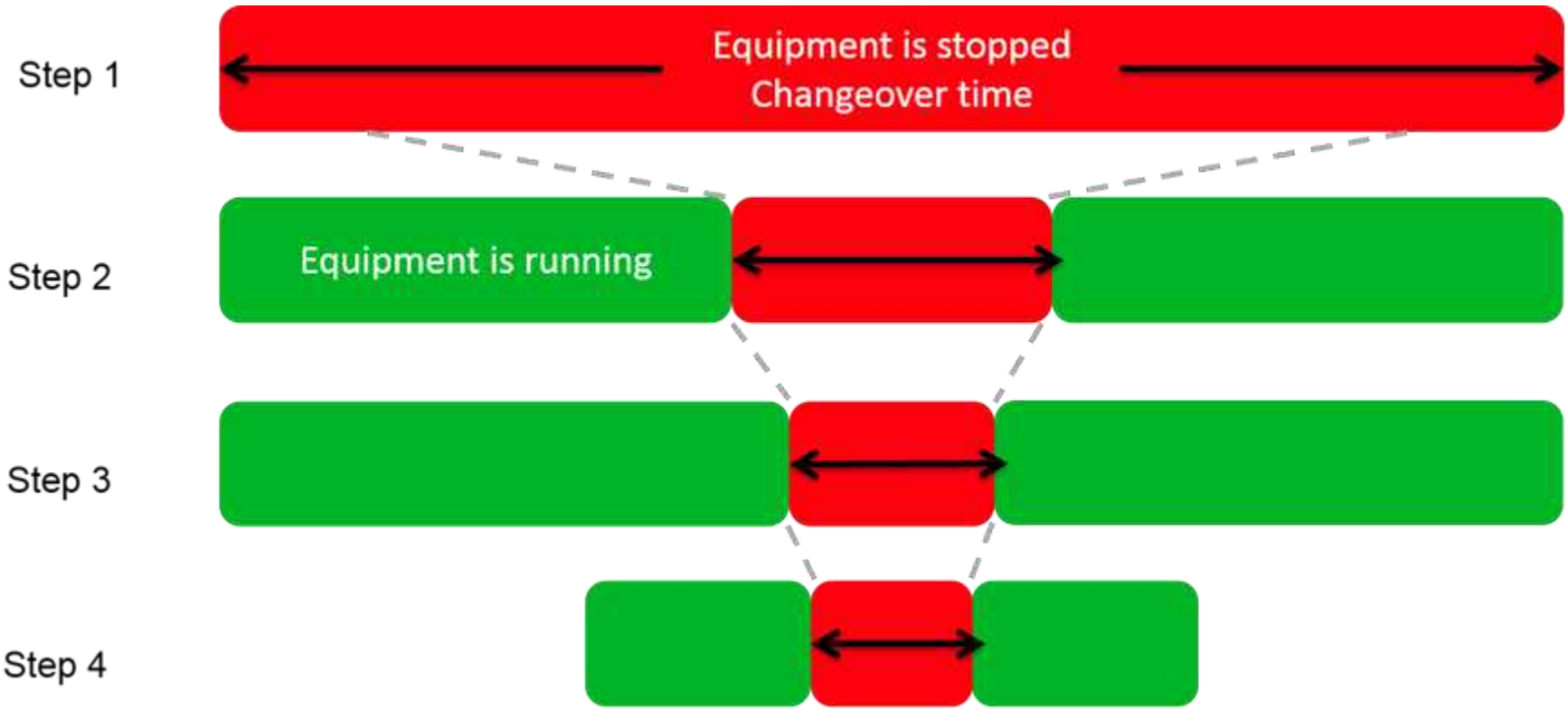
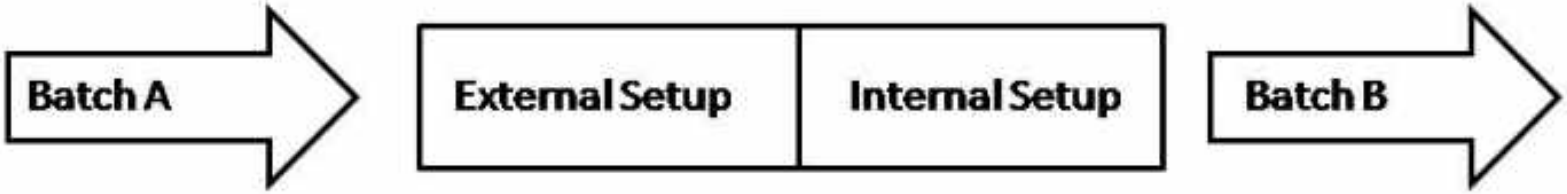
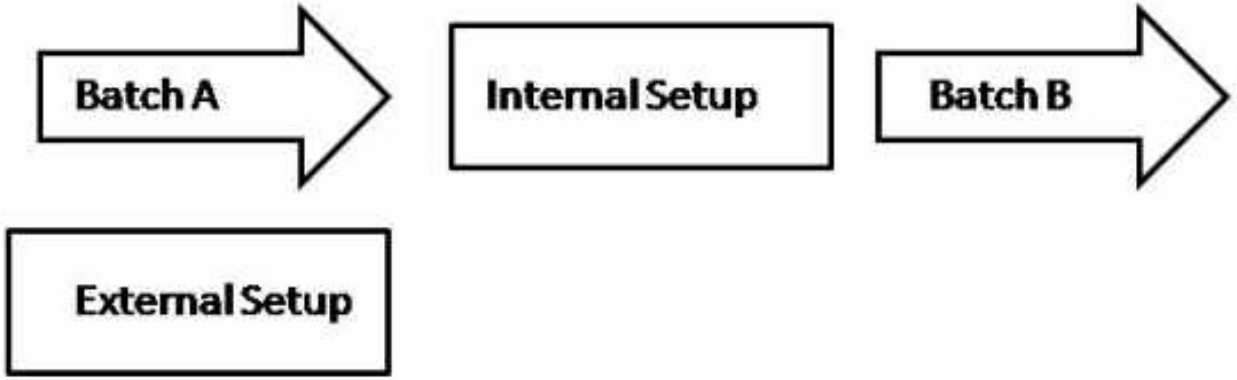


Stage 1 – Identify External and Internal Setup Activities



Stage 1 – Separate External Activities



GIVE BLOOD
Save Lives

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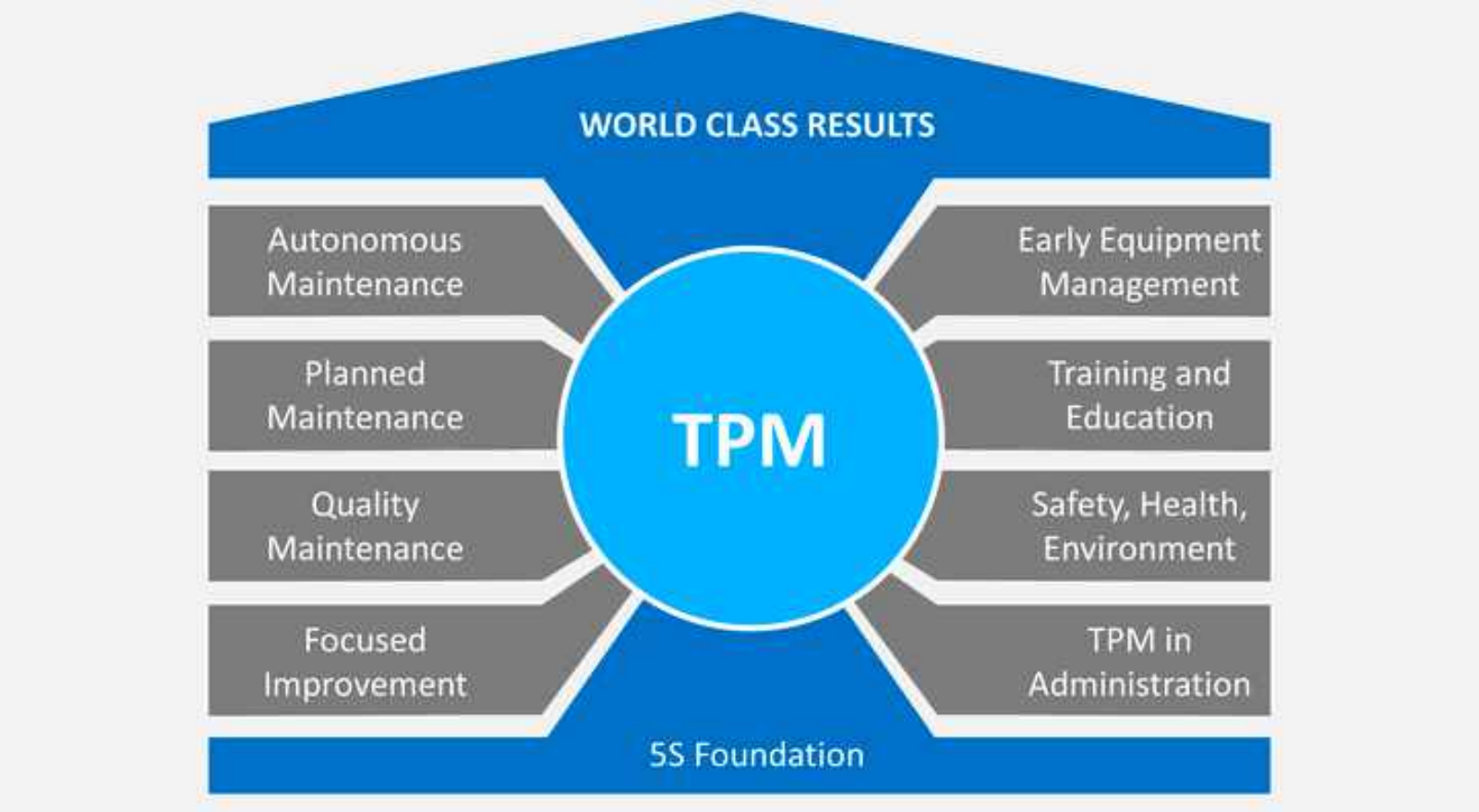
Lean Six Sigma TPM

Total Productive Maintenance (TPM)



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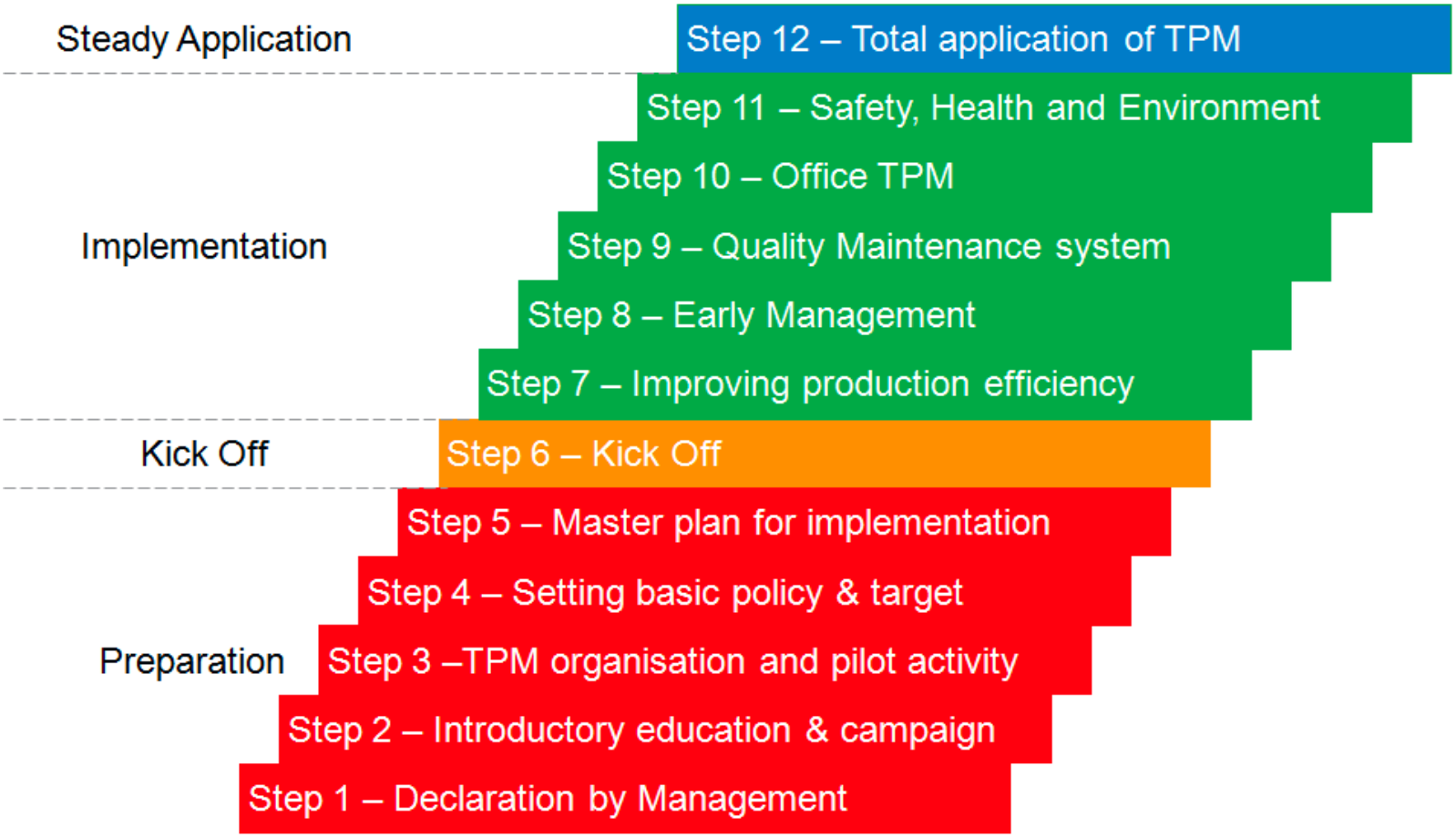
Total Productive Maintenance (TPM)



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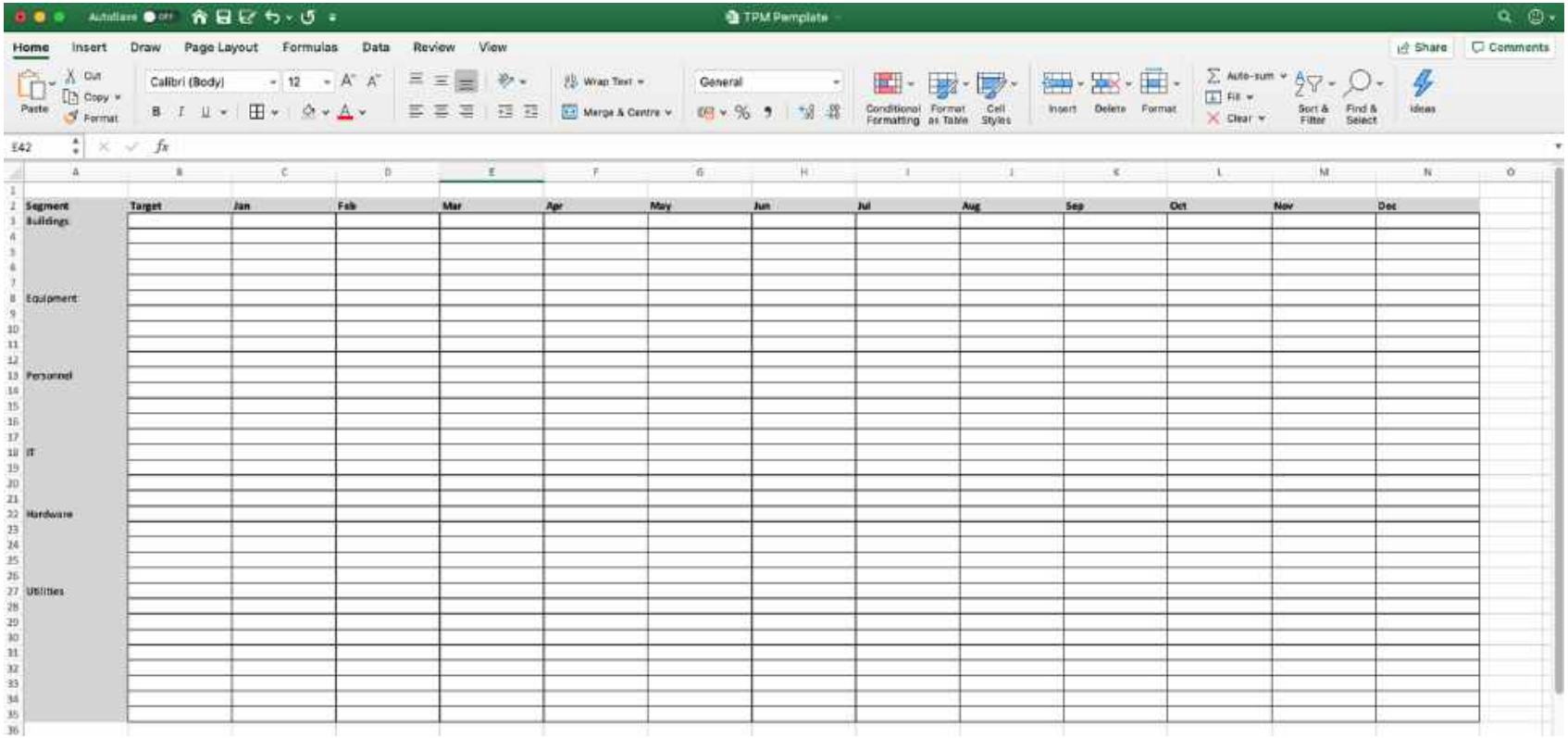
Total Productive Maintenance (TPM)



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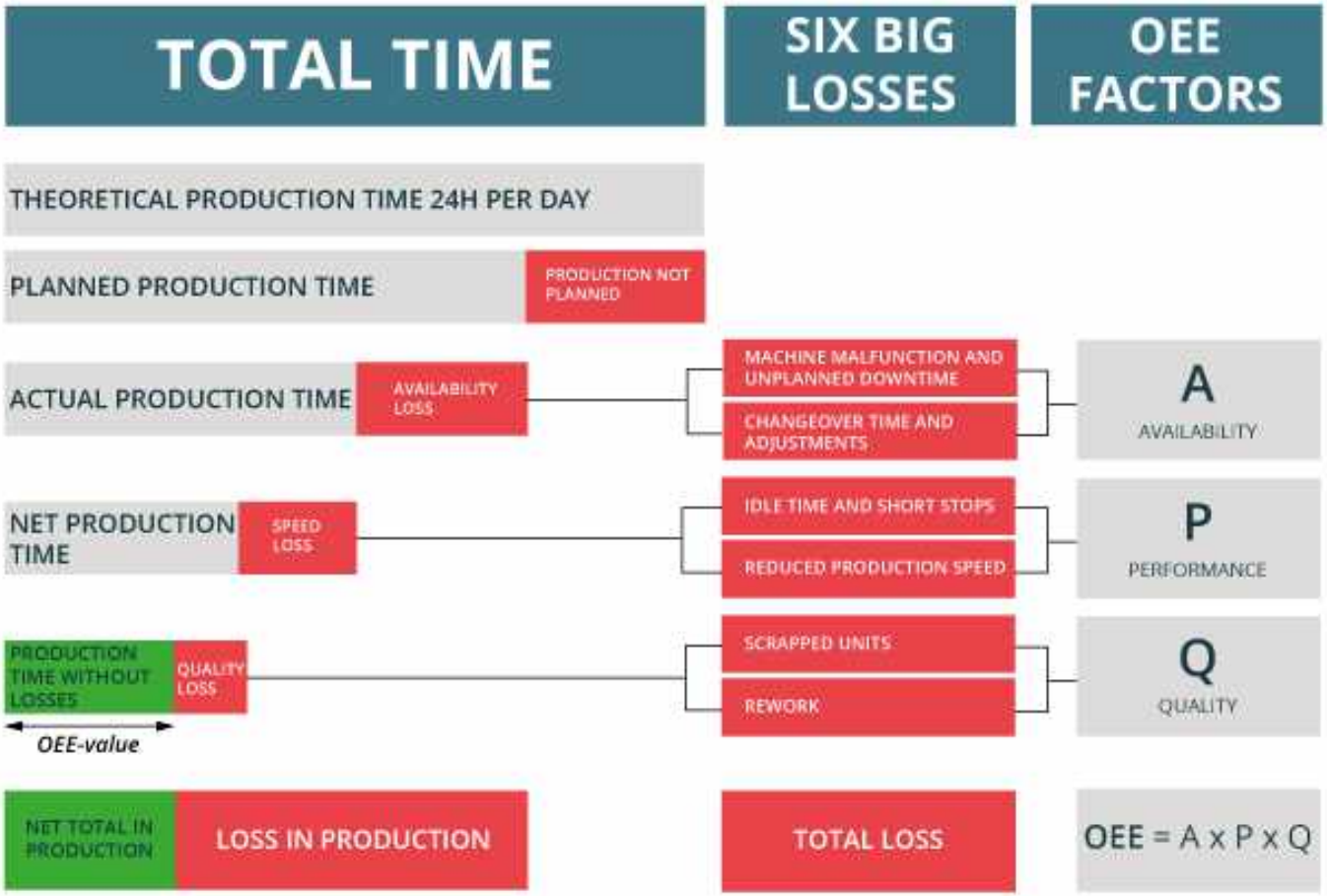
Lean Six Sigma OEE

Overall Equipment Effectiveness (OEE)



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Overall Equipment Effectiveness (OEE)

PREFERRED CALCULATION

The preferred OEE calculation is based on the three OEE Factors: Availability, Performance, and Quality.

OEE is calculated by multiplying the three OEE factors: Availability, Performance, and Quality.

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Overall Equipment Effectiveness (OEE)

Overall Equipment Effectiveness	Recommended Six Big Losses	Traditional Six Big Losses
Availability Loss	Unplanned Stops	Equipment Failure
	Planned Stops	Setup and Adjustments
Performance Loss	Small Stops	Idling and Minor Stops
	Slow Cycles	Reduced Speed
Quality Loss	Production Rejects	Process Defects
	Startup Rejects	Reduced Yield
OEE	Fully Productive Time	Valuable Operating Time

Overall Equipment Effectiveness (OEE)

Availability takes into account all events that stop planned production long enough where it makes sense to track a reason for being down (typically several minutes).

Availability = Runtime / Planned Production Time

Overall Equipment Effectiveness (OEE)

Performance takes into account anything that causes the manufacturing process to run at less than the maximum possible speed when it is running (including both Slow Cycles and Small Stops).

Performance is the ratio of Net Run time : Run Time

Performance = Ideal cycle time * Total Count / Run Time

Overall Equipment Effectiveness (OEE)

Quality takes into account manufactured parts that do not meet quality standards, including parts that need rework.

OEE Quality is similar to RTY, in that it defines Good Parts as parts that successfully pass through the manufacturing process the first time without needing any rework.

Quality = Good Count / Total Count

Calculating OEE

Calculating OEE:

EXAMPLE

$$\text{Availability} = \frac{\text{Running time}}{\text{Net operating time}} = \frac{360 \text{ minutes}}{480 \text{ minutes}} = \mathbf{0.75} \ (\times 100 = 75\%)$$

$$\text{Performance} = \frac{\text{Actual output}}{\text{Target output}} = \frac{648 \text{ lbs}}{1080 \text{ lbs}} = \mathbf{0.60} \ (\times 100 = 60\%)$$

$$\text{Quality} = \frac{\text{Good output}}{\text{Actual output}} = \frac{518 \text{ lbs}}{648 \text{ lbs}} = \mathbf{0.8} \ (\times 100 = 80\%)$$

OEE = 0.75 x 0.6 x 0.8 x 100 = 36%

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Lean Six Sigma Gemba

Gemba Walks

- Frequent
- Respectful
- To observe
- To learn

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6-Step Gemba Walk Preparation

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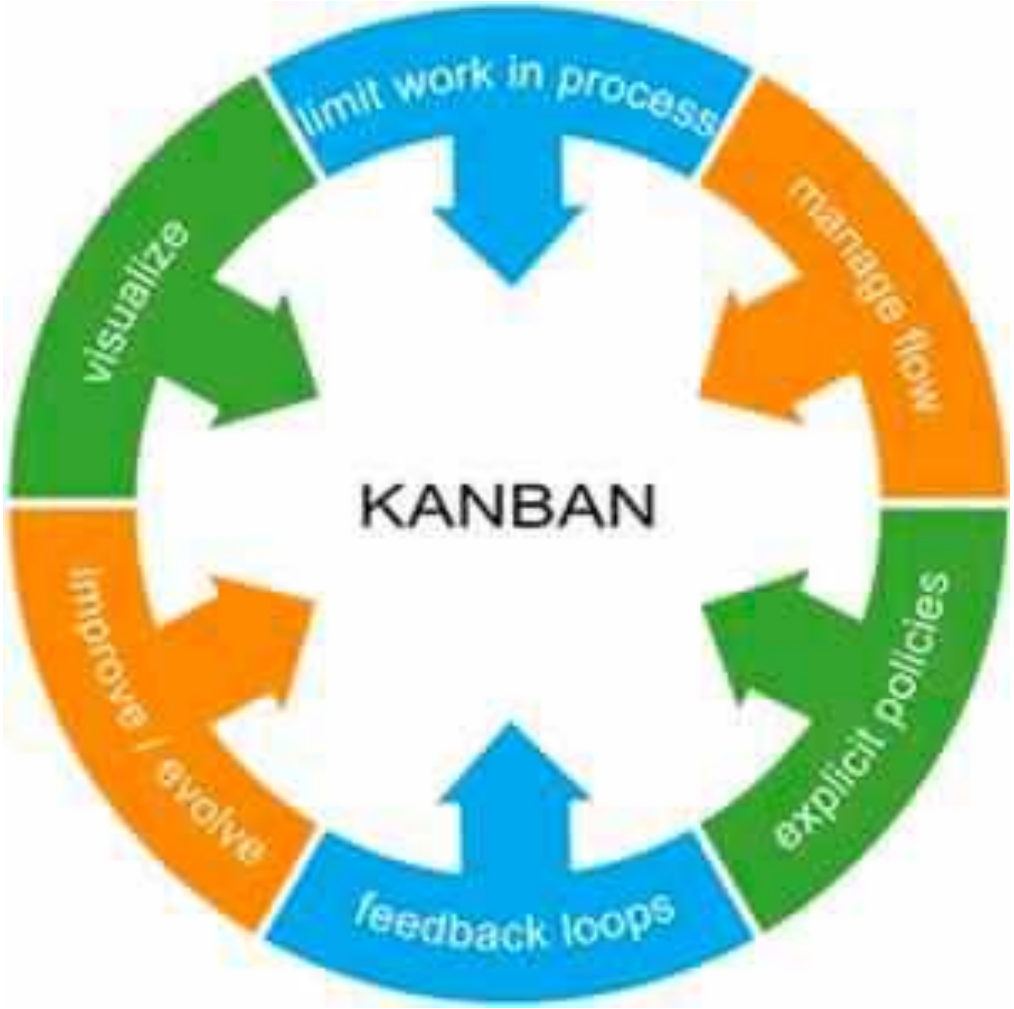
Lean Six Sigma KanBan

Kanban



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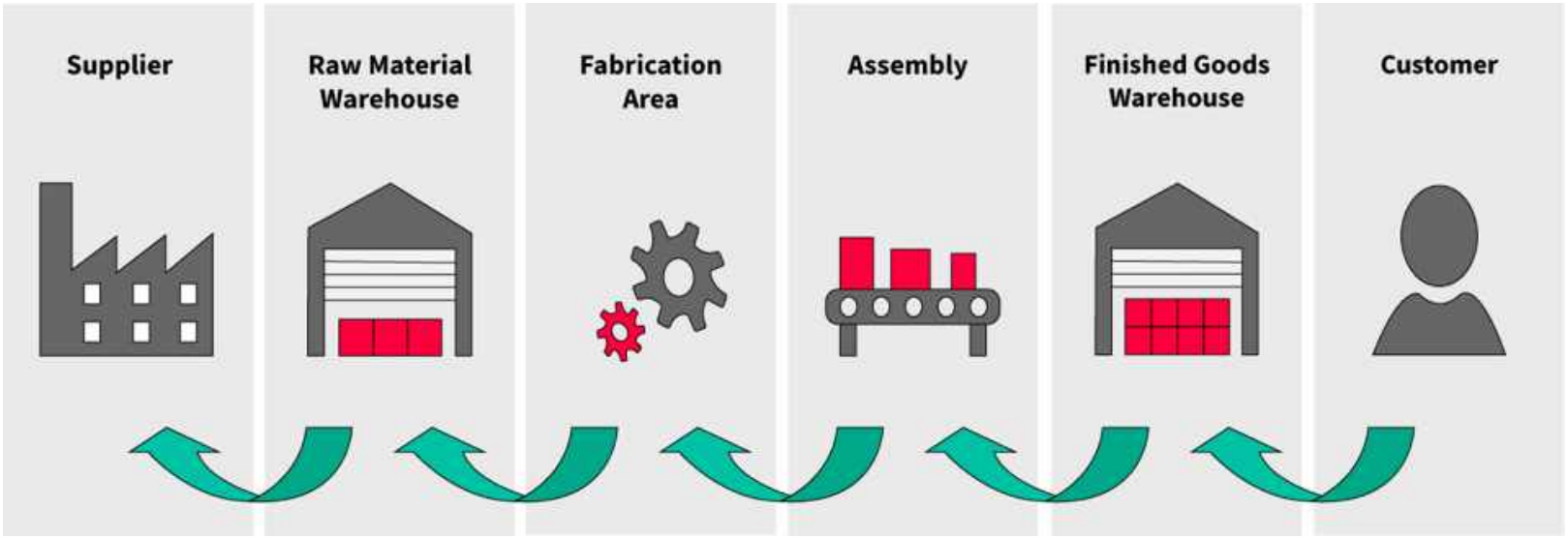
Kanban




EXTRA VALUE MEALS
1
2
3
4
5
6
7
VEG PRODUCTS
NON-VEG PRODUCTS

Kanban

Do not replenish

Replenish

Kanban

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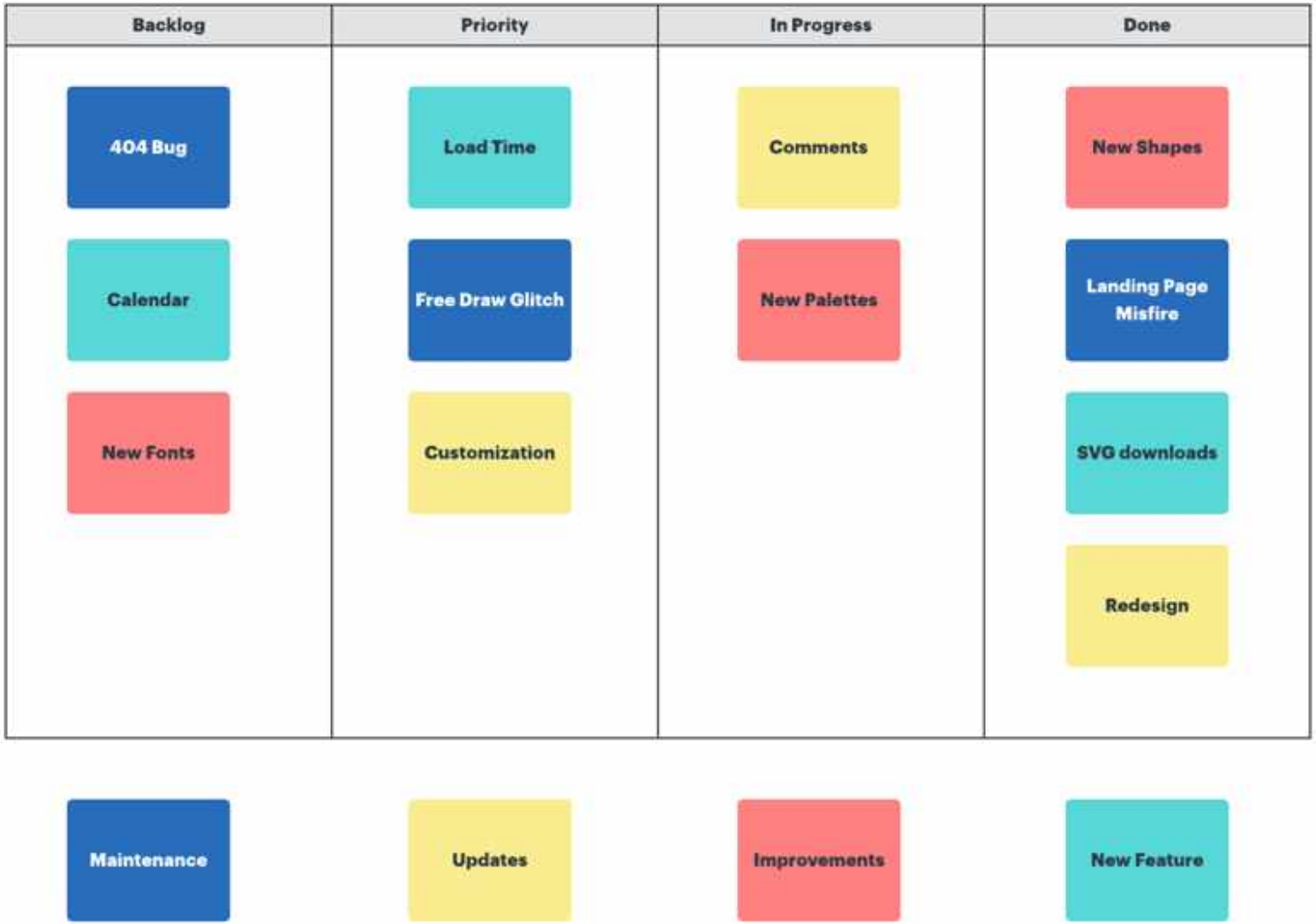
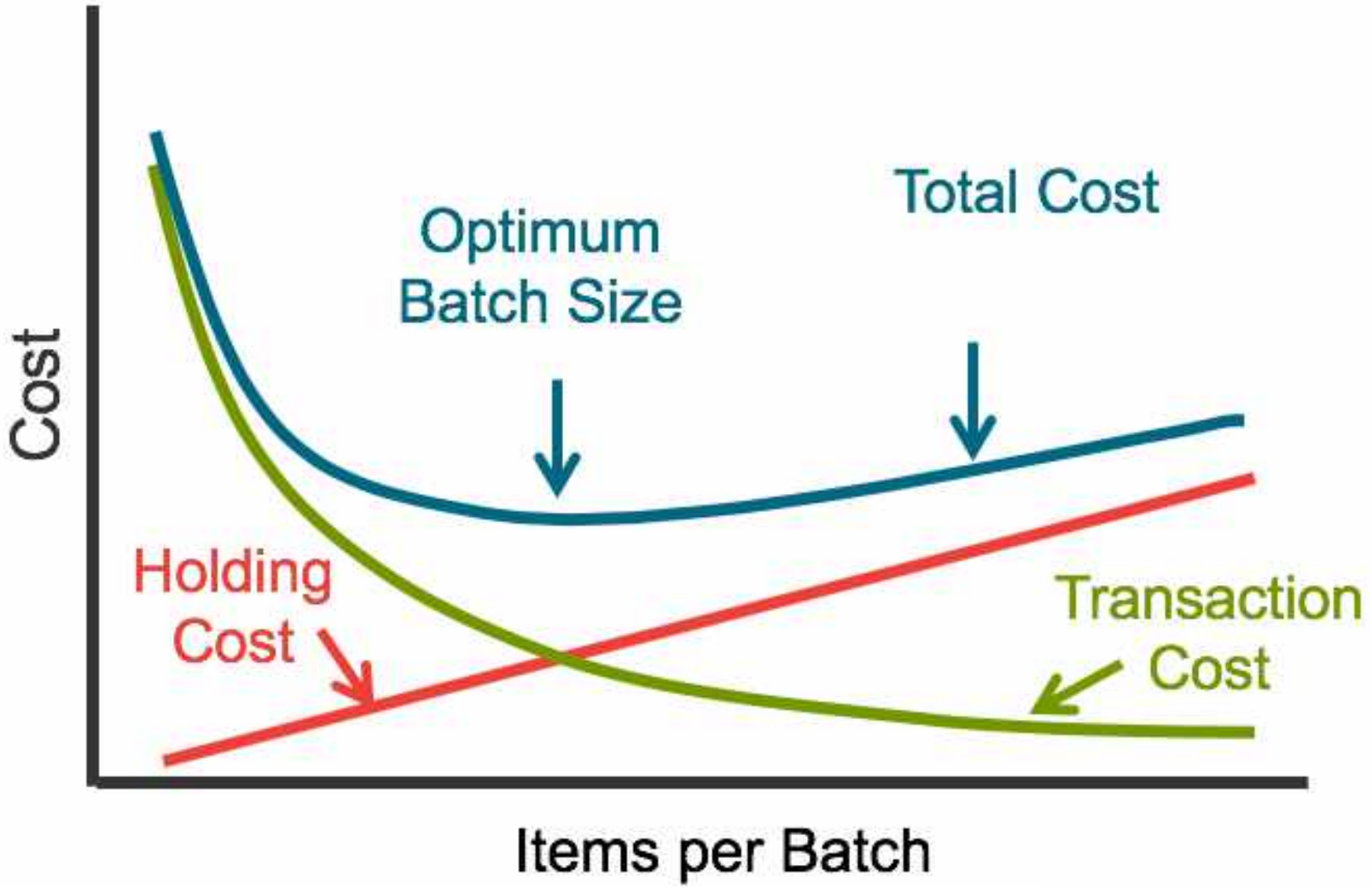
Kanban Board



Batch Quantity



5 Factors That Influence Card Formulas

- ☐ Customer takt
- ☐ Regular time of replenishment system
- ☐ Changes in replenishment system
- ☐ Customer changes
- ☐ Buffer/safety margin

Number of Kanban

=

DT(1+x)/C

Number of Kanban = DT(1+x)/C

D: Demand per unit of time
T: Lead time
C: Container capacity
X: Buffer, or safety factor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