LEAN + SIMULERING + OPTIMERING = ETT VINNANDE RECEPT FÖR BÄTTRE BESLUT

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BRINGING TOGETHER LEAN, SIMULATION AND OPTIMIZATION

DEFINING A FRAMEWORK TO SUPPORT DECISION-MAKING IN SYSTEM DESIGN AND IMPROVEMENT

PT Nätverk *ASSAR*

Datum: *2020-03-10*

AKUTEN…

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HUR TAR VI BESLUT?

Magkänsla

Deliberativ / Rigorös beslutsfattande

Erfarenhet

Kunskap

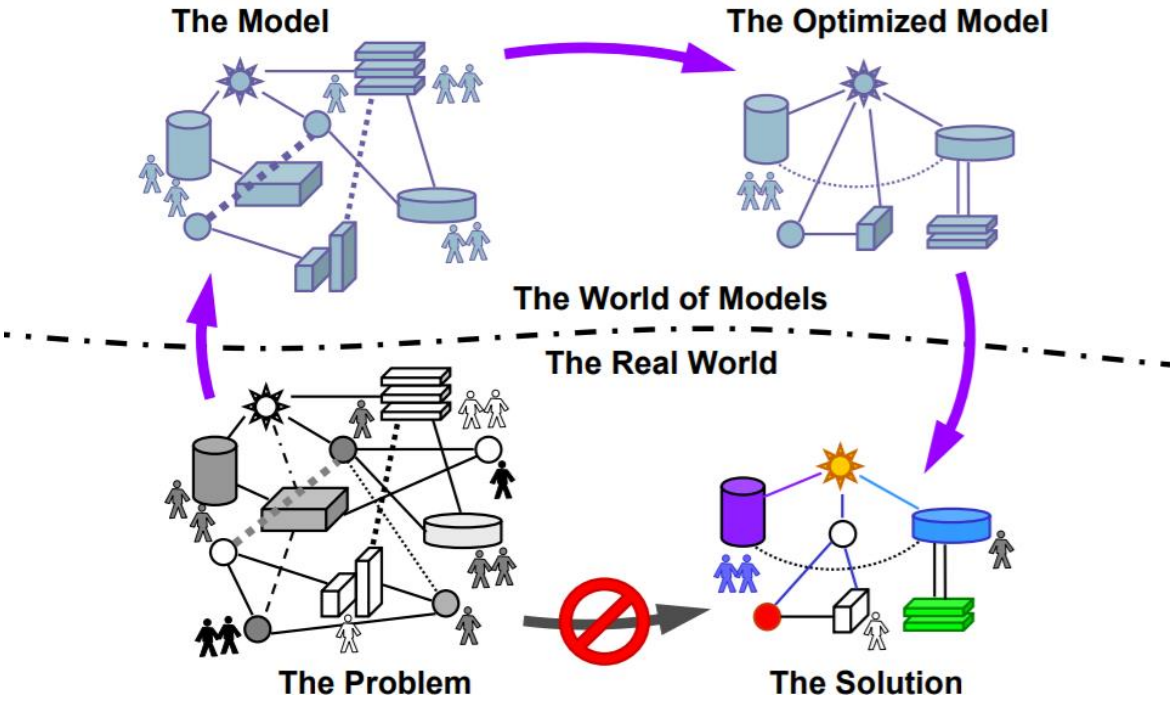
Preferenser

Historisk data

Metoder för att stödja kvalitetsbeslut

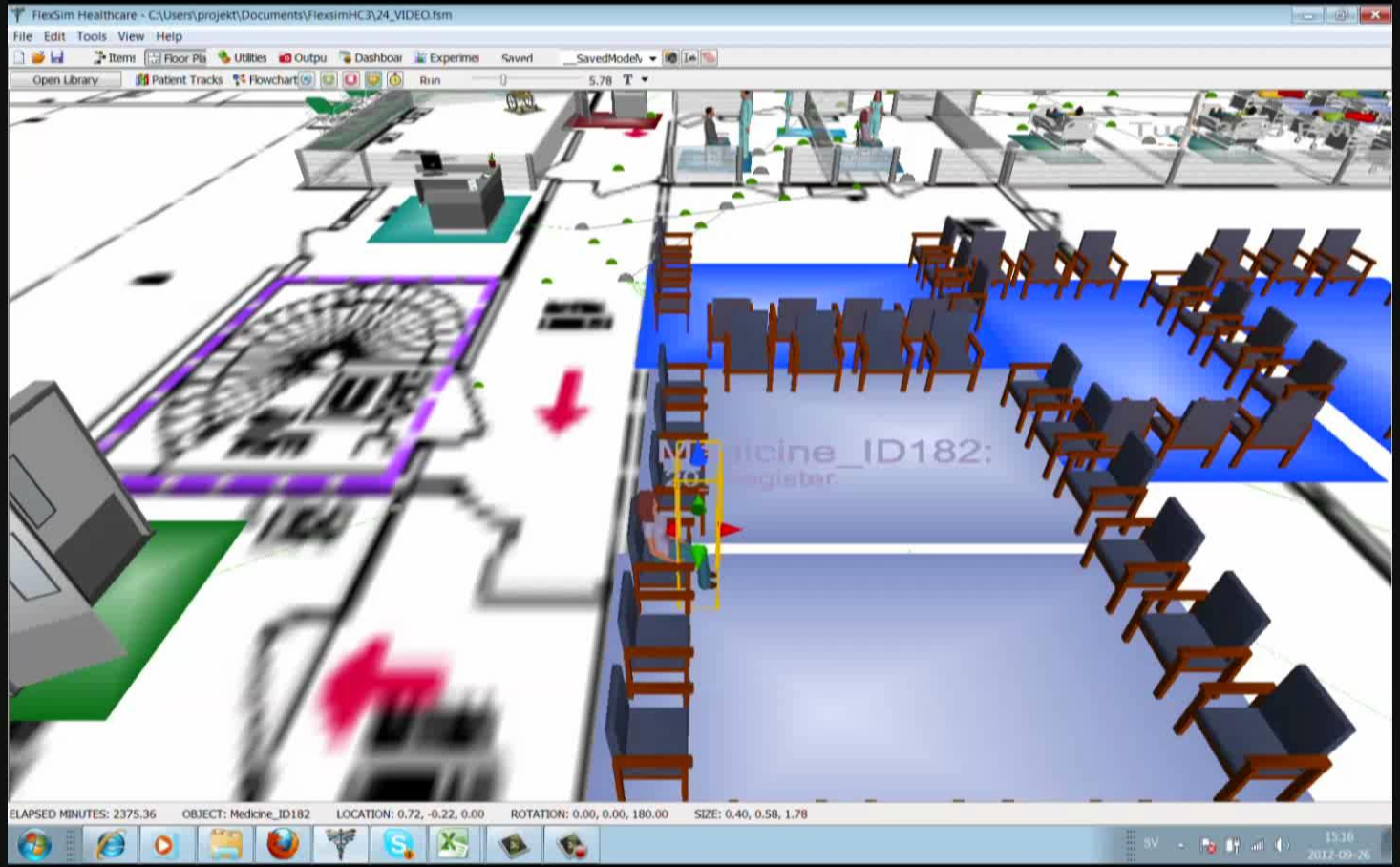
VILKA METODER ELLER VERKTYG ANVÄNDER NI?

HUR TAR VI BESLUT?



Source: Anylogic

VAD ÄR SIMULERING?



Akutmottagning

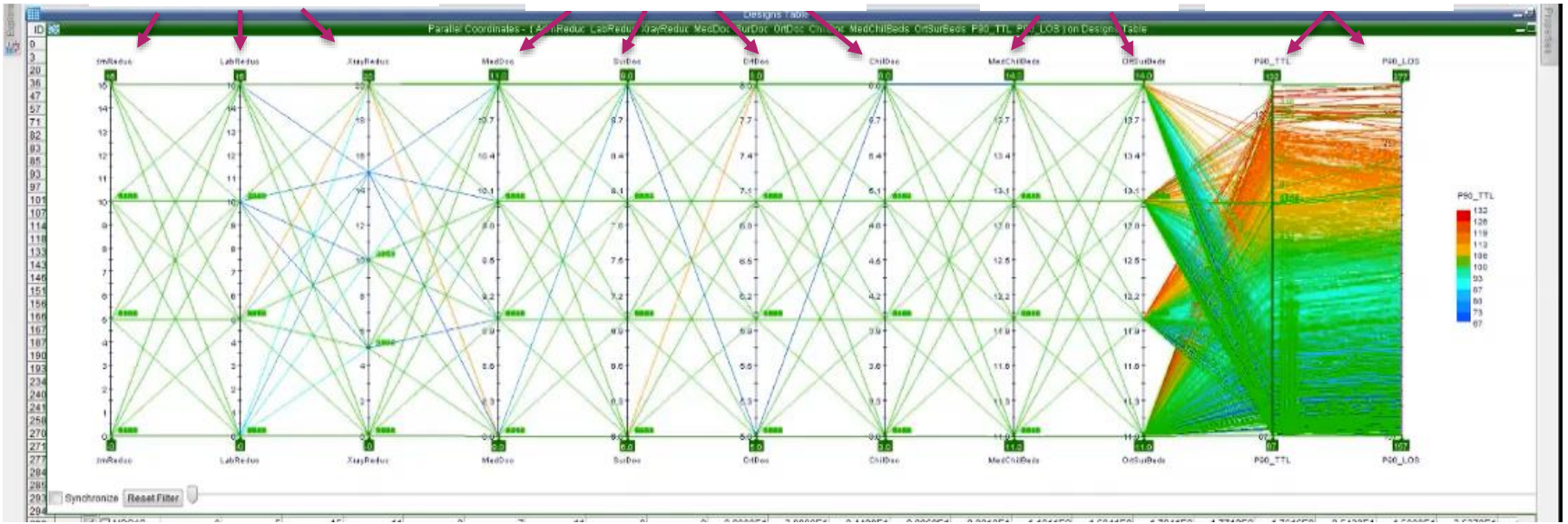
SIMULERINGSBASERAD OPTIMERING

Väntetider för lab, X-ray,…

Antal läkare

Antal sal

Mål



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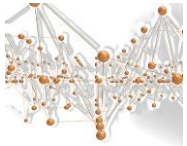
Lean + simulering + optimering = ett vinnande recept för bättre beslut

FÖRDELAR MED KOMBINATIONEN

Lean

- Lean methods and tools limitations





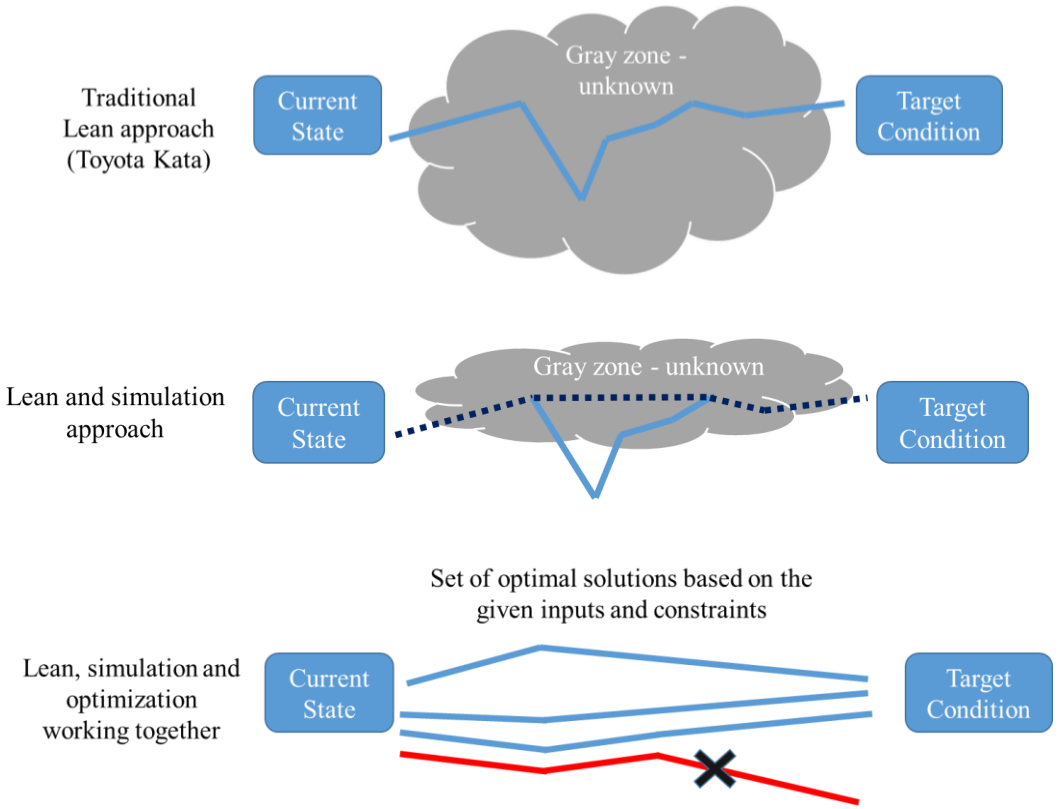
- Lean strengths

Simulation

- Simulation strengths
  - Handles variation
  - Can test before implementation
  - Support the elimination of *muri*, *muda* and *mura*
  - Ability to analyze complex systems & interrelationships

- Improvement possibilities
  - Not as extended
  - Simulation process and outcomes aligned with Lean
  - When simulation is not applicable
  - Lean knowledge
  - Interaction with Lean practitioners -Teamwork approach (expert vs. participative)

VARFÖR BEHÖVER VI OPTIMERING?



FÖR VILKA ÄNDAMÅL?

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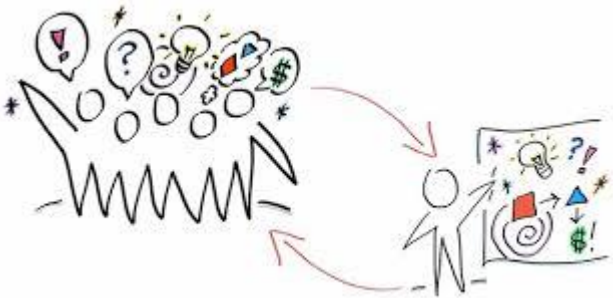
Education

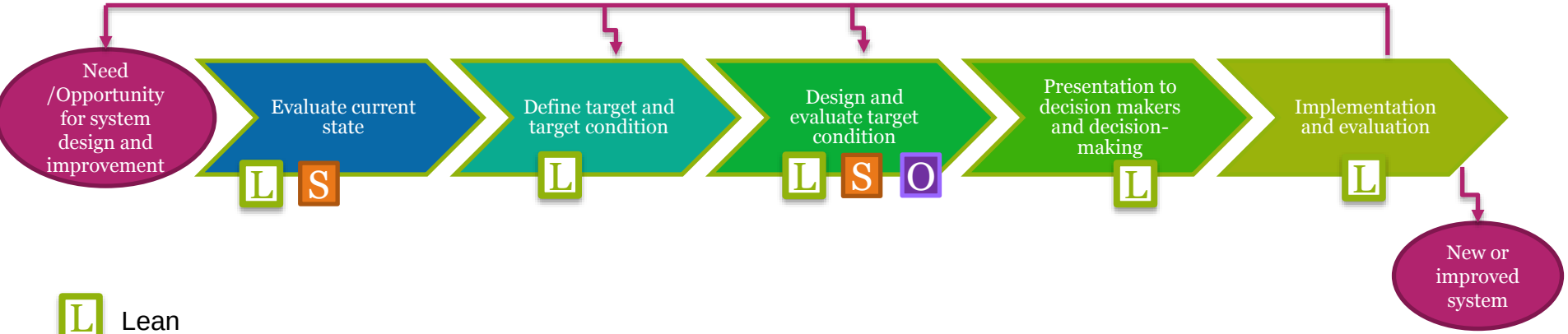
Facilitation



Evaluation

Based on Robinson et al. (2012)

EN PROCESS FÖR SYSTEM DESIGN OCH FÖRBÄTTRING



L Lean

S Simulation

O Optimization

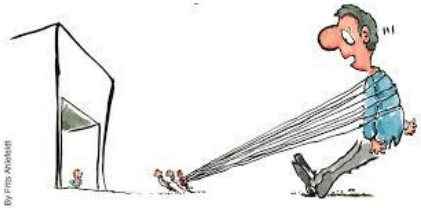
Team members:

- Project team
- Decision makers
- Lean engineers
- Simulation engineers

VILKA HINDER HAR VI?

Reaction to change

Involvement of managers



Required expertise

Required time and investment

Generation breach and credibility

Losing the gemba

Previous negative experiences

Terminology

Opposition to use industrial methods and tools

HUR KAN MAN BÖRJA?

HUR KAN MAN BÖRJA?

Utbildning

Integrera i nuvarande standarder

Ledning

Samarbete

Rätt method
för rätt problem

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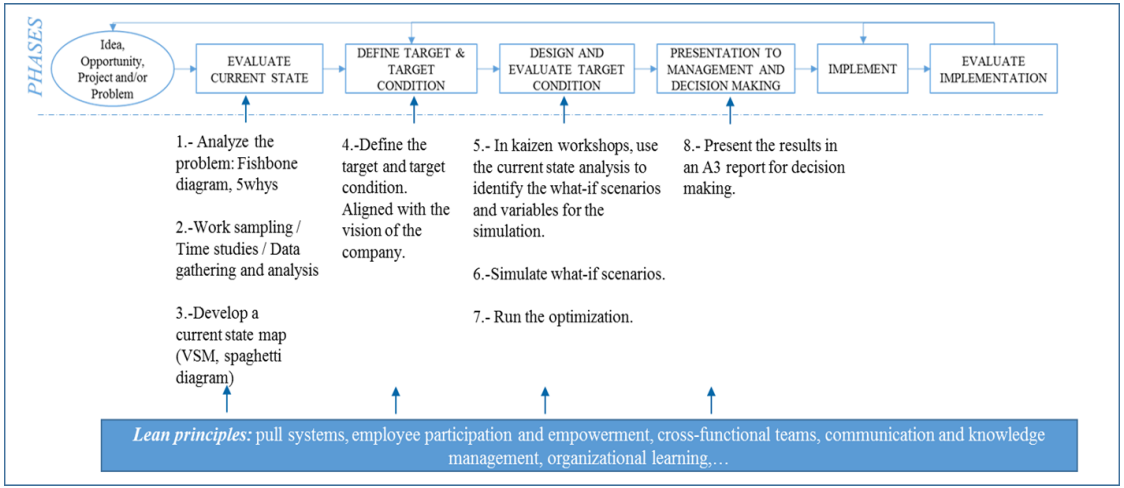
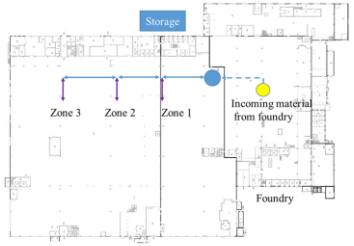
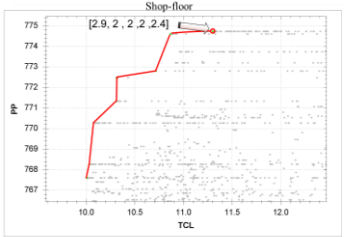
EXEMPEL

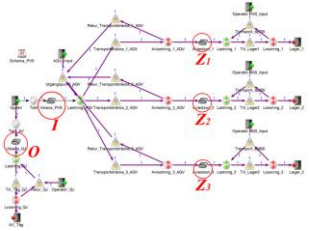
APPLICATION IN REAL-WORLD CASES

Case V, Project V.1: Improving the material flow efficiency in a manufacturing company.





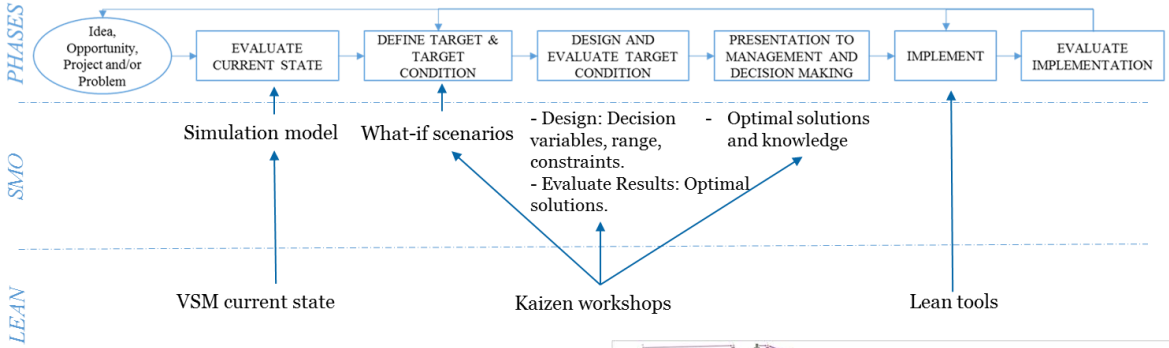


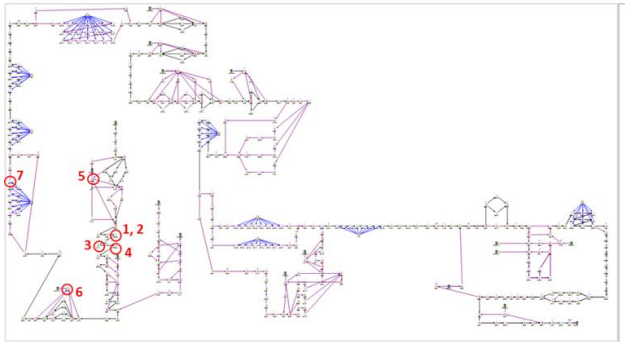


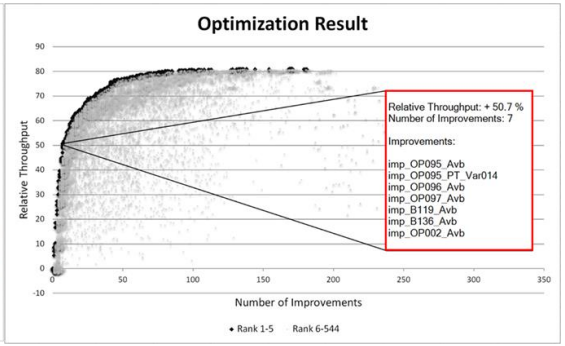
Team members: *Lean manager, simulation engineers, project supervisors, production manager, production technicians, inventory & logistic personnel, machine operators, forklift truck drivers.*

APPLICATION IN REAL-WORLD CASES

Case II, Project II.1: Improvement of a machining line to increase its production capacity.





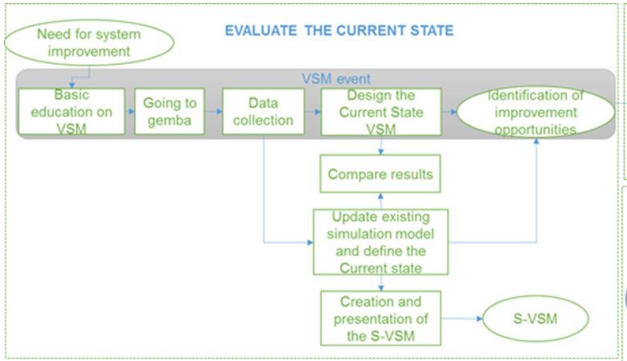


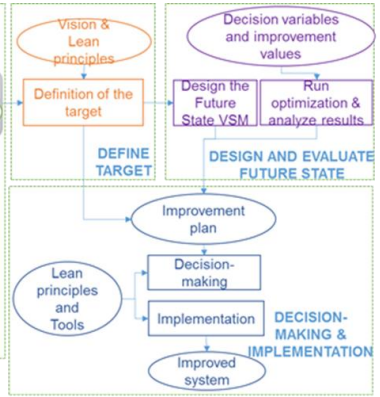
First published by Bernedixen and Ng (2014)

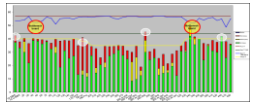
Team members: Production manager, production engineers, maintenance engineers, production technicians, operators, simulation engineers.

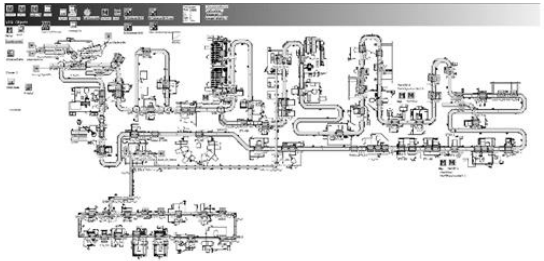
APPLICATION IN REAL-WORLD CASES

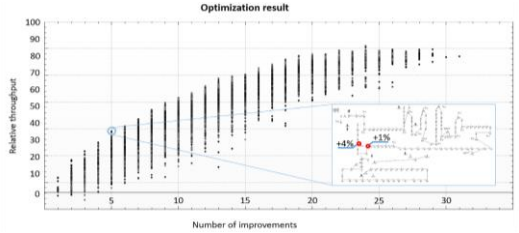
Case II, Project II.2: Improvement of an assembly line via A VSM event.











Example of optimal system configuration:

+4% availability in Station X
+1% availability in Station Y
To reach 35% relative improvement in throughput

Team members: *Lean manager, production manager, process manager, simulation engineer, operators, production engineers and production technicians. (17 people)*

TACK SÅ MYCKET!

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