

PPU231 - PROJECT INTRODUCTION

Current state:

Predominantly product offerings of low-end E-bikes (~15.000 SEK)

Core business is frame design (including drive system and battery)

In-house production of frames (components from OEM)

Low production efficiency



Competitive pressures:

Rapidly growing demand of high-end E-bikes

Limited market for traditional business model due to high price (>50.000 SEK)

Desired future state:

Develop PSS solutions for high-end E-bikes (product project)

Improve production efficiency (production project)

Profit
M SEK

Production

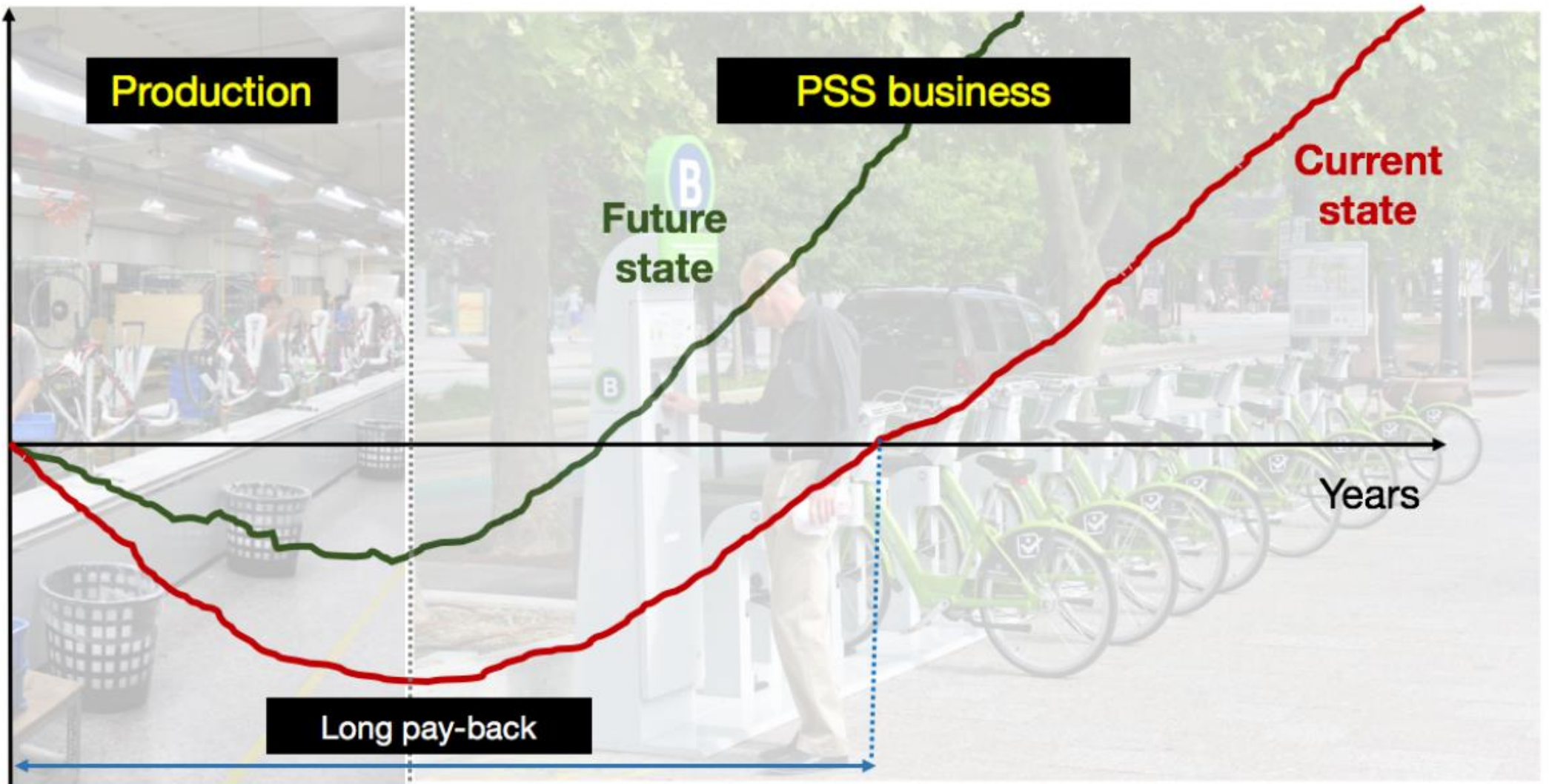
PSS business

**Future
state**

**Current
state**

Years

Long pay-back





CHALMERS

SCHEDULE

Specific lectures:




Note that during the project weeks there are some **specific lectures** for production or product groups!

| | | | |
|---|--|--|----|
| Thursday, 2021.02.04, 08.00-09.45 | https://chalmers.zoom.us/j/69454510202 🔗 Password: PPU231 | Maintenance policy using RCM (Production groups only!) | TY |
| | https://chalmers.zoom.us/j/7906370509 | Value and stakeholder assessment (Product groups only!) | OI |
| Monday, 2021.02.15, 15.15-17.00 | https://chalmers.zoom.us/j/69454510202 🔗 Password: PPU231 | Priority-based maintenance (Production groups only!) | AI |
| | https://chalmers.zoom.us/j/62389009138 | Life cycle cost analysis (Product groups only!) | MP |
| Monday, 2021.02.22, 13.15-15.00 | https://chalmers.zoom.us/j/69454510202 🔗 Password: PPU231 | Production service improvements (Production groups only!) | AI |
| | https://chalmers.zoom.us/j/65975493631 🔗 | PSS cost benefit (Product groups only!) | MP |

Common lectures:

Note that during the project weeks there are some **common lectures** to production AND product groups!

| | | | |
|---------------------------------------|--|---|-------------|
| Thursday, 2021.02.04, 10-11.45 | https://chalmers.zoom.us/j/67452330362 🔗 Password: PPU231 | Integrated product and production system development | MP |
| Monday, 2021.02.15, 13.15-15.00 | https://chalmers.zoom.us/j/67452330362 🔗 Password: PPU231 | Service design – Guest lecture | Karin Lycke |

| | | | |
|---|--|------------------|-------------------|
| Thursday, 2021.02.11, 08.00-09.45 | https://chalmers.zoom.us/j/67452330362  Password: PPU231 | Joint workshop 1 | TY, AI, OI, MP |
| Thursday, 2021.02.25, 08.00-09.45 | https://chalmers.zoom.us/j/67452330362  Password: PPU231 | Joint workshop 2 | TY, AI, OI, MP |
| Thursday, 2021.03.11, 08-11.45 | https://chalmers.zoom.us/j/67452330362  Password: PPU231 | Project seminar | TY, AI, OI, MP |

Workshops:

Note that during the project weeks
there are **two joint workshops!**
Mandatory active participation.

Project seminar

In the last week, the group will present the
project results. Mandatory participation.

| | | | |
|---------------------------------------|-------|--------------------------------------|-------------------|
| Friday, 2021.02.05, 15.15-17.00 | (***) | Project work – scheduled supervision | TY, AI, OI, MP |
|---------------------------------------|-------|--------------------------------------|-------------------|

| | | | |
|---------------------------------------|-------|--------------------------------------|-------------------|
| Monday, 2021.02.08, 15.15-17.00 | (***) | Project work – scheduled supervision | TY, AI, OI, MP |
|---------------------------------------|-------|--------------------------------------|-------------------|

| | | | |
|---------------------------------------|-------|--------------------------------------|-------------------|
| Friday, 2021.02.12, 15.15-17.00 | (***) | Project work – scheduled supervision | TY, AI, OI, MP |
|---------------------------------------|-------|--------------------------------------|-------------------|

| | | | |
|---|-------|--------------------------------------|-------------------|
| Thursday, 2021.02.18, 10.00-11.45 | (***) | Project work (scheduled supervision) | TY, AI, OI, MP |
|---|-------|--------------------------------------|-------------------|

| | | | |
|---------------------------------------|-------|--------------------------------------|-------------------|
| Monday, 2021.03.01, 13.15-15.00 | (***) | Project work (scheduled supervision) | TY, AI, OI, MP |
|---------------------------------------|-------|--------------------------------------|-------------------|

| | | | |
|---|-------|--------------------------------------|-------------------|
| Thursday, 2021.03.04, 10.00-11.45 | (***) | Project work (scheduled supervision) | TY, AI, OI, MP |
|---|-------|--------------------------------------|-------------------|

Supervision:

Make sure to book the time with the supervisor. Google forms are weekly released (Production groups!). For product groups, contact Massimo directly.

SPECIFY YOUR QUESTION FOR THE SUPERVISION MEETING!

Deadline and reporting – mandatory activities during the project

- Upload the first joint workshop report at Canvas before **2021.02.19 at 23.55**.
- Send the draft report to the opposing group via email and upload that at Canvas before **2021.03.04 at 23.55**.
- Upload the Power-Point presentation slides at Canvas before **2021.03.10 at 23.55**.
- Upload the written opposition report at Canvas before **2021.03.10 at 23.55**.
- Upload the final report as a .pdf document at Canvas before **2021.03.19 at 23.55**.

PRODUCT GROUPS

- Send the design changes until **2021.02.19 at 23.55**.

PRODUCTION GROUPS

- Send the evaluation report until **2021.02.23 at 23.55**.

Some tools for online collaboration

1. Zoom
2. Google Docs or similar (documentation)
3. Trello (project organization, task division, planning...)
4. Miro (brainstorming, mindmaps...)
5. Slack (fast communication)

Do you have any other tips?

PRODUCTION PROJECT

E-bike Inc. needs help!

Current situation

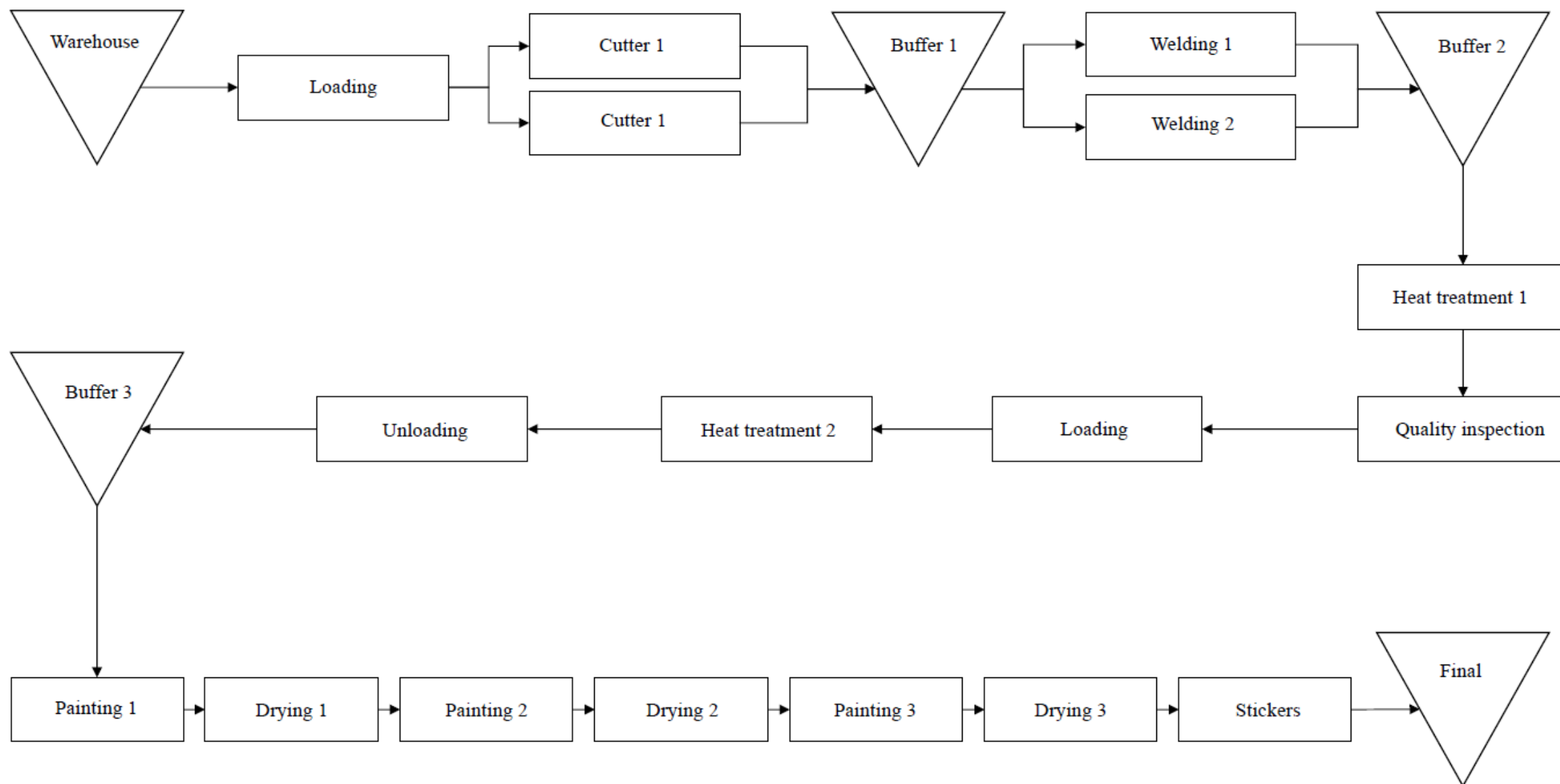
- Need to increase production efficiency to meet customer demand

Problems

- Currently low levels of productivity
- Production disturbances
- Lack of integration

Solutions

- Maintenance management
- Prioritisation
- Disturbance management
- Work integration



Five main tasks



1. Maintenance Policy Selection using RCM

- a) RCM proposition
- b) Advantages / disadvantages

2. Priority-based Maintenance

- a) Production capacity
- b) Prioritisation of reactive maintenance
- c) From reactive to proactive maintenance

3. Production service improvements and disturbance management

- a) Comparing OEE and active periods
- b) Maximizing OEE
- c) Other factors impacting OEE

4. Design of a Production Service System

5. Evaluation of product design changes on production performance & Circular economy solutions



CHALMERS
UNIVERSITY OF TECHNOLOGY

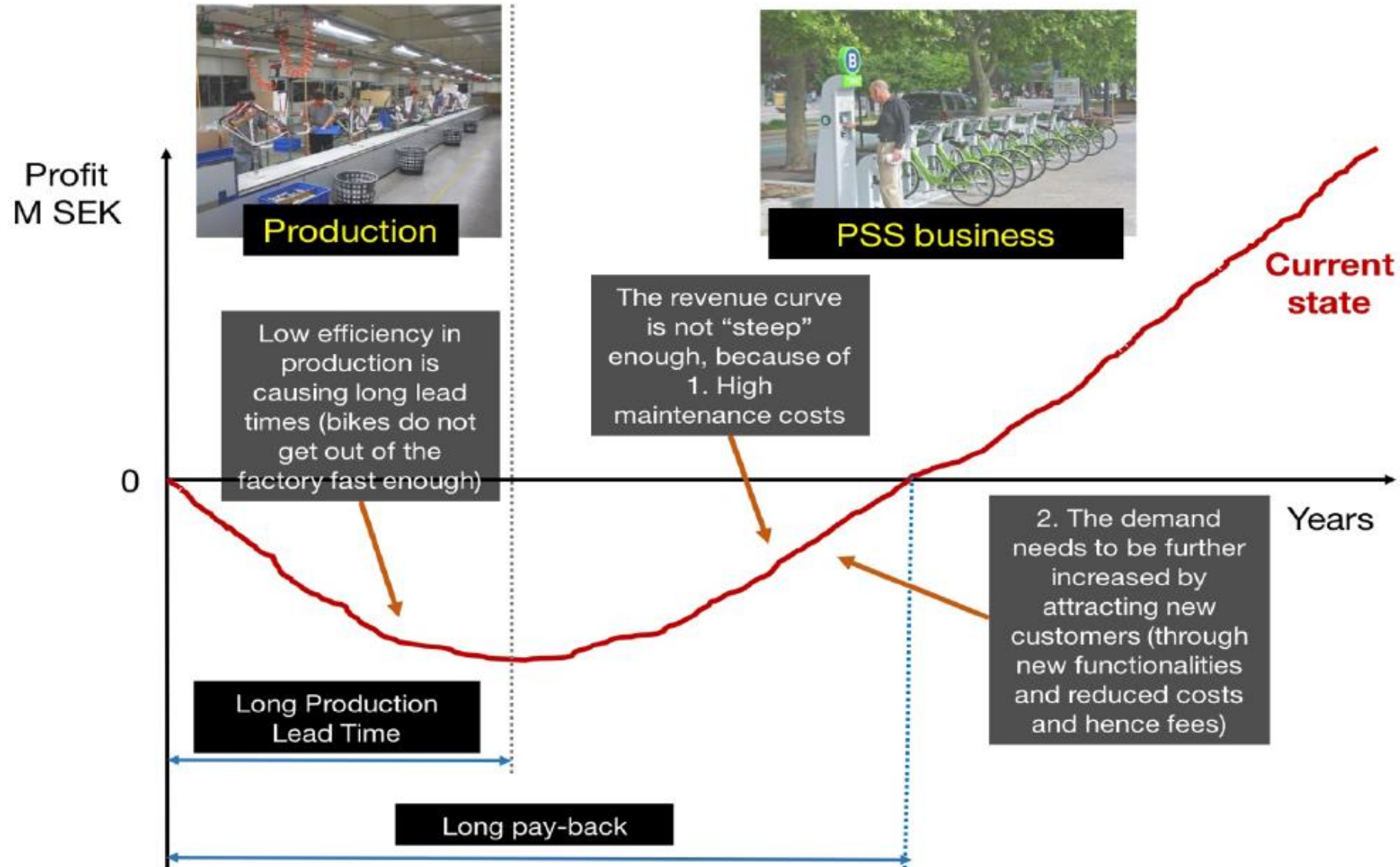
Product project

Ola Isaksson, Professor, ola.isaksson@chalmers.se

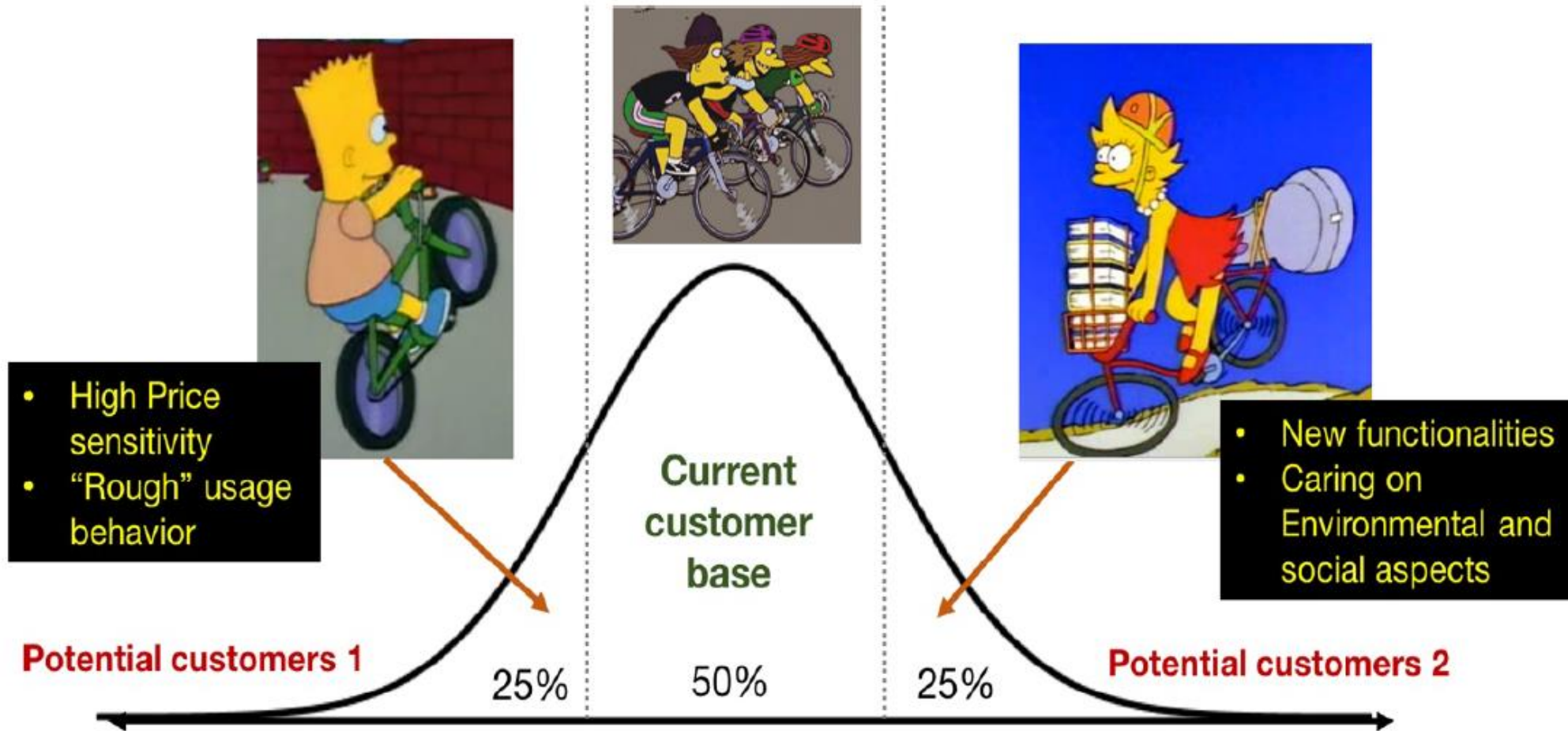
Massimo Panarotto, Researcher, massimo.panarotto@chalmers.se

Division of Product development, Department of Industrial and Materials
Science

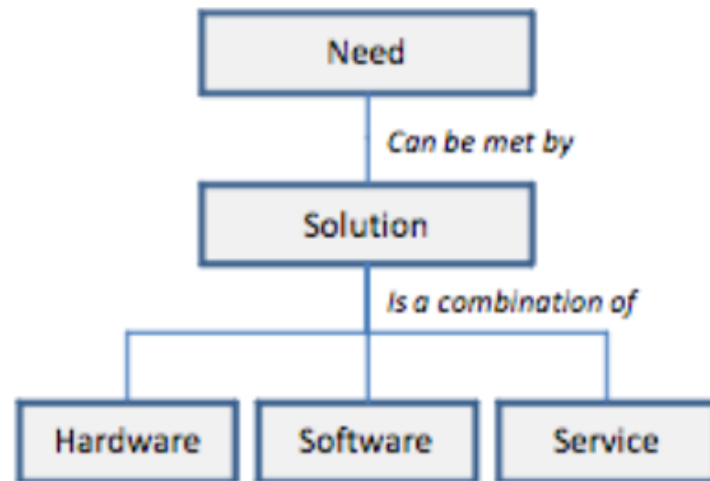
Current State



Attracting new customers



You are asked to



Isaksson, O., Larsson, T. C., & Johansson, P. (2011). Towards a Framework for developing Product/Service Systems. In *Functional Thinking for Value Creation* (pp. 44–49). Berlin, Heidelberg: Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-19689-8_10

You are asked to suggest to top management:

1. a **packaged description** of the new offer as a PSS,
2. a **cost/benefit assessment** and a recommendation for future implementation. You are assigned to replace and/or improve a current product (or set of products) and suggest a PSS replacement/alternative.

The PSS will be presented as a mixed and integrated set of “components” where component are solutions to different needs/functions in the PSS system, and is a mix of hardware, software and services.

TASKS

1. Stakeholder Value and Function analysis of chosen product in its current form
2. Description of a PSS solution
 - Represented with at least one of the methods for PSS representation (customer journey map, use case diagram, activity diagram, business process modelling)
 - Prototyped with at least one of the methods for PSS prototype (video prototyping, Desktop Walkthroughs, Role-playing, Experience Prototyping, Service Walkthroughs, Paper Prototyping, Digital Mockups)
3. Lifecycle cost (LCC) of developed PSS solution vs. current offering
4. Discussion of value and cost along the lifecycle for customers and manufacturer

TASKS

5. Evaluation of frame design changes on production systems, and impact on PSS value and cost along the lifecycle
6. Do a SWOT analysis of the original product to enhance the function analysis with a broader view.
7. Suggest the introduction of possible technologies to the “base” product that would **reduce the risk of maintaining ownership for the manufacturer**, and assess the cost and value of such technology
8. Develop a roadmap for the transition from product to PSS for the company and justify the suggestions made
9. Develop an action plan for the company to become more circular-economy oriented.

THIS WEEK

1. Begin with reading project PM
2. Begin with reading **suggested reading#1**
3. Look at how an e-bike works (important function analysis with Ola's first lecture and Task 1)
 - <http://www.explainthatstuff.com/electricbikes.html>
 - <https://www.evelo.com/electric-bikes-101/>
 - <https://www.youtube.com/watch?v=WILb91xXxws>
4. Look at reviews for bike sharing in blogs and reviews (important for value analysis with Ola's first lecture and Task 1)
 - <http://theconversation.com/heres-what-bike-sharing-programs-need-to-succeed-85969>
 - <https://www.citynomads.com/bike-sharing-singapore-review/>
 - <https://www.theguardian.com/lifeandstyle/2018/feb/04/ofo-bike-share-review-it-will-be-to-cycling-what-uber-is-to-taxis>
5. Look at relevant design changes on a bike frame (important for task 5)
 - https://ac.els-cdn.com/S1877042812006350/1-s2.0-S1877042812006350-main.pdf?_tid=a6f1c958-0a51-11e8-8fb5-00000aabb0f6b&acdnat=1517820824_47abff2a1ee3e913825be57be2de4315
 - <http://bicycle.tudelft.nl/schwab/Publications/moore2010accurate.pdf>

THANK YOU!



CHALMERS