OST
Ostschweizer
Fachhochschule

Swiss Logistics Faculty, Dec. 2020

Sustainable Planning of Product Phase-Outs

Field Report of a Project together with Leica Geosystems

Fabian Leuthold

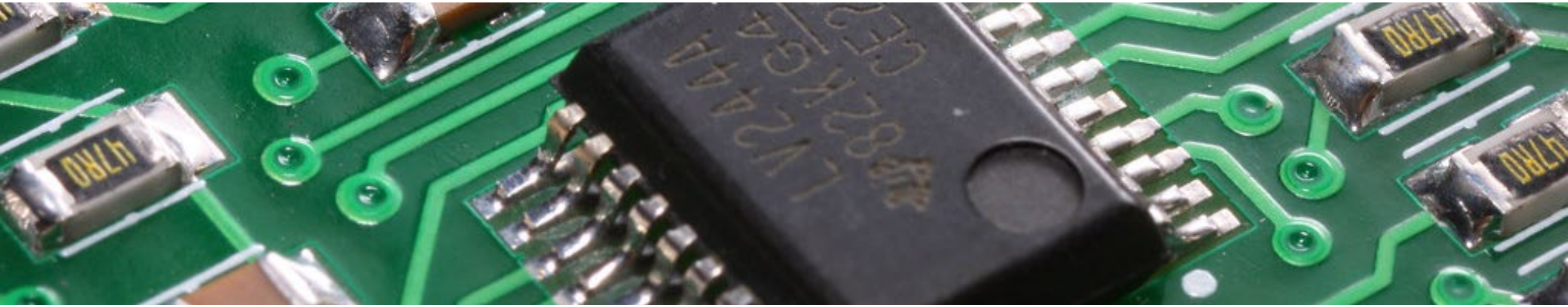
2nd December 2020

Institute for Modeling and Simulation

Overview

1) Professional Background
2) Mathematical Modeling
3) Optimizer Tool Demonstration

Professional Background



JTAG board 1, A. Magill, Link, CC-BY 2.0

Motivation of the Project

A joint **Project** of the **Institute for Modeling and Simulation** of the **OST** with Leica Geosystems

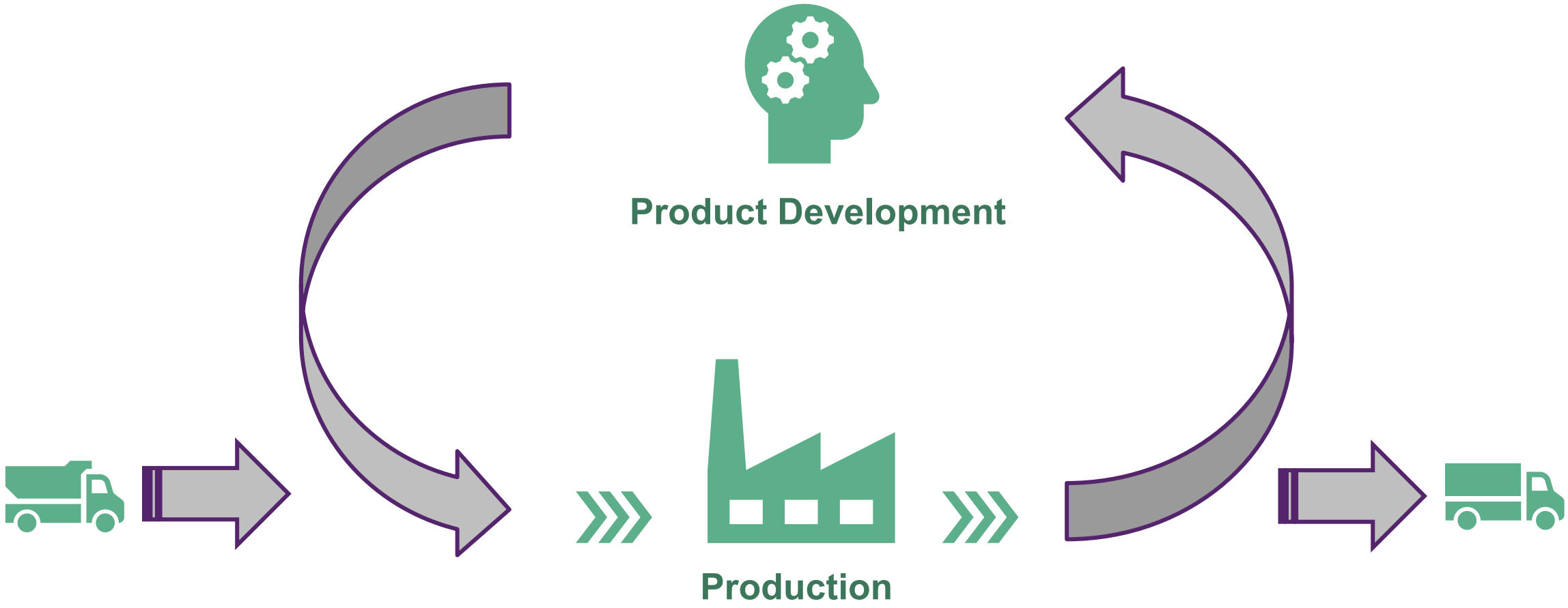
to **optimize** the **"Product Phase-Out".**

Reasons?

Motivation?

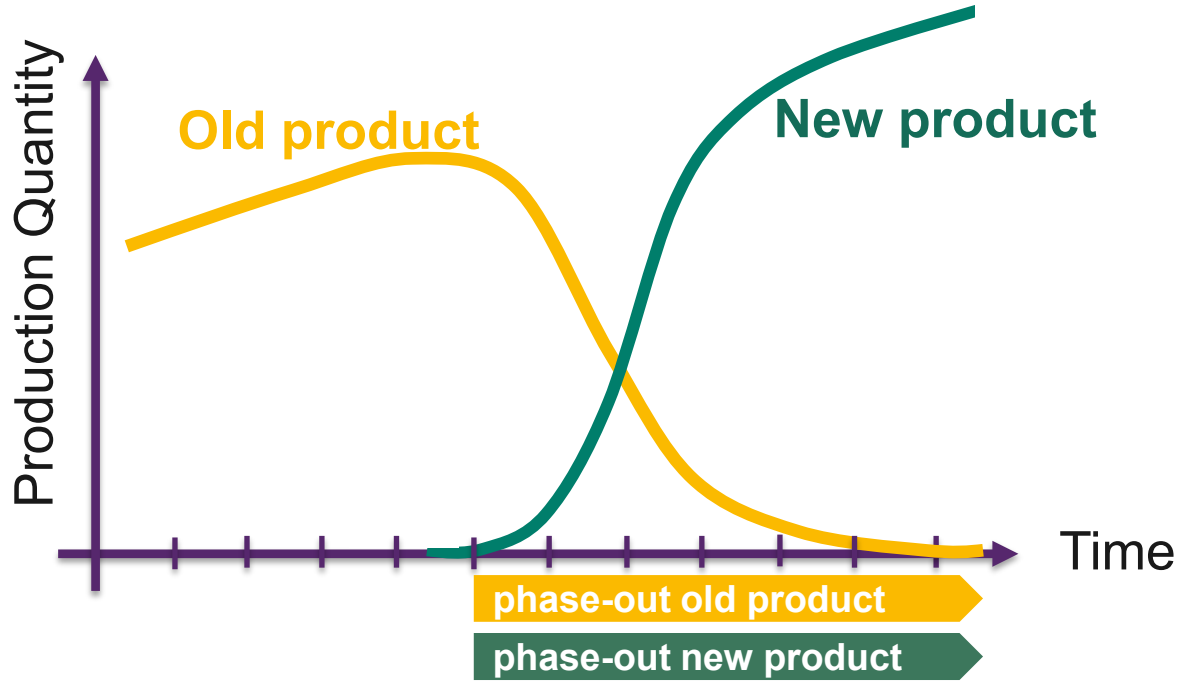
Sustainability?

Products have a life cycle

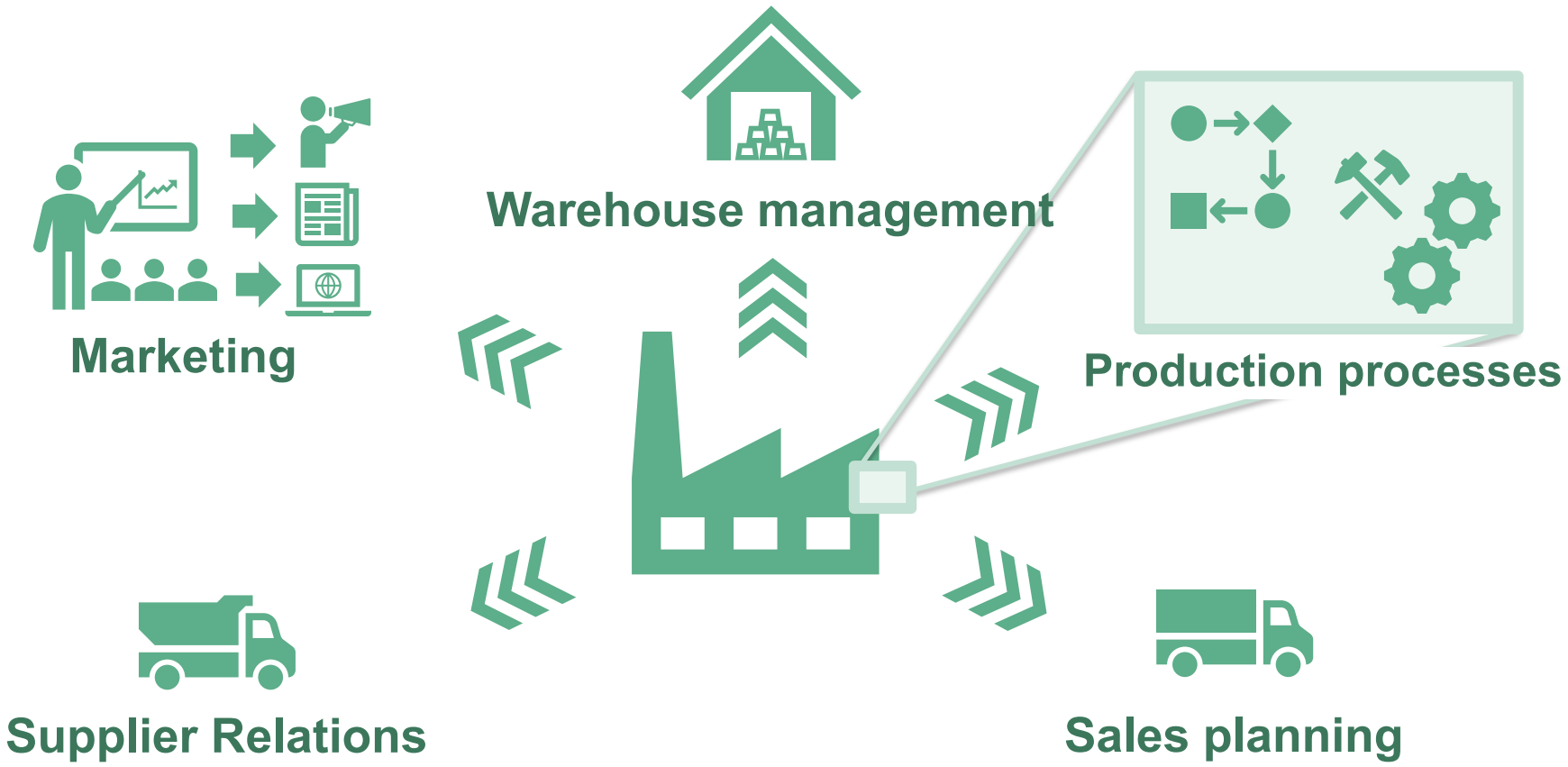


Product Phase-In and Phase-Out

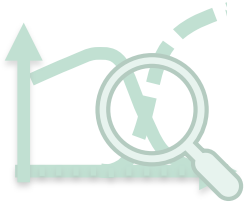
All **coordination efforts** to **introduce new products** and **replace old ones** are called **phase-in / phase-out.**



Areas affected by Phase-Ins and Phase-Outs



Support Sustainability in Product Phase-Outs



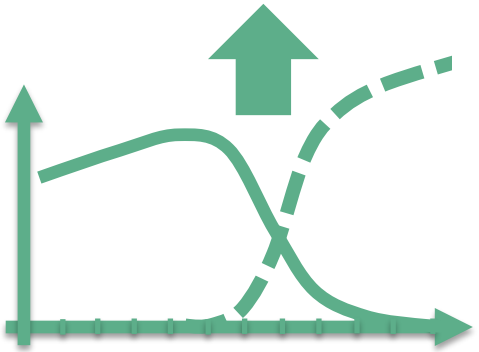
Before

Warehouse

Old Product

- Component A (3x)
- Component B (1x)
- Component C (2x)

Scrapping & Recycling



Phase-Out

After

Warehouse

New Product

- Component E (3x)
- Component F (1x)
- Component G (2x)
- Component H (2x)

Time

OST

Sustainability-Target in Phase-Outs

Minimization of costs for scrapping & recycling

☑ Sustainability

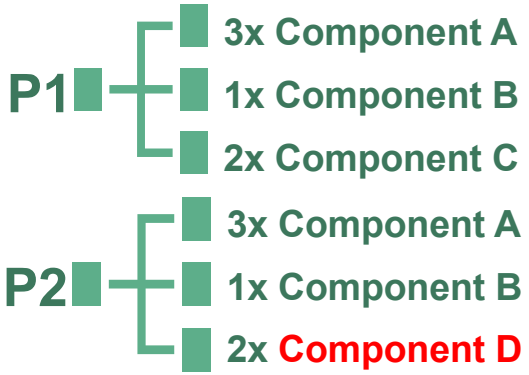
☑ Profitability

Minimization of Scrapping Costs, a Piece of Cake?

<u>Idea:</u> Why not simply exhaust all remaining stocks in phase-out first and only then start producing new products?

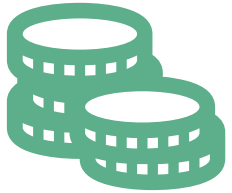
Minimization of Scrapping Costs, a Piece of Cake?

Bill Of Material - Relationship



Product Demand Forecast

Component Prices

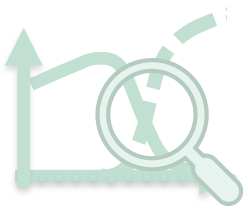


Stocks

Service Demand

Obligations of Acceptance

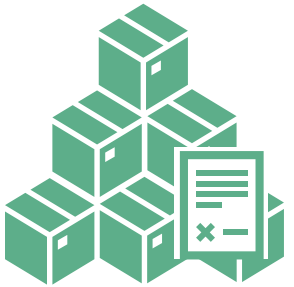
Varying Obligations of Acceptance for different Suppliers



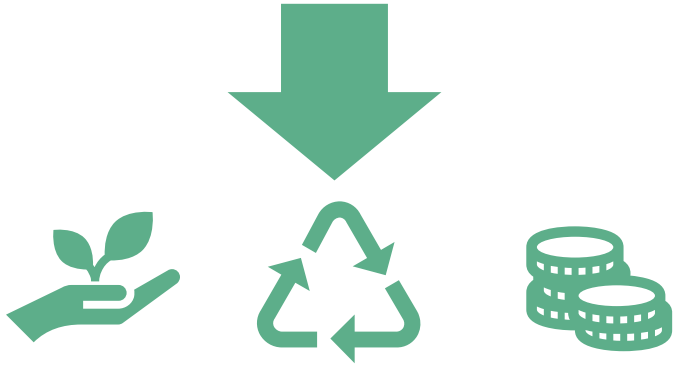
Lotsizes

Minimum Order Quantity (MOQ)

Quantity Contract



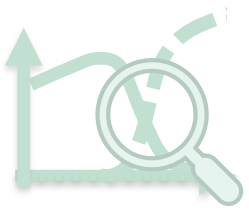
What are the Parameters for minimizing Scrapping Costs?

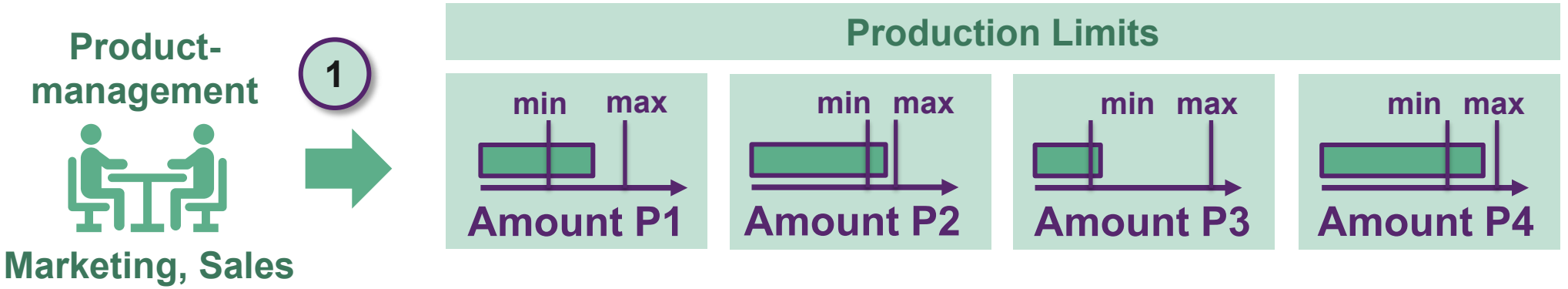


Increase

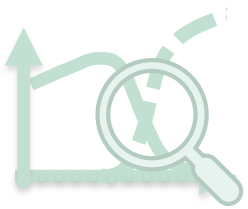
Sustainability & Productivity

Parameters: Number of Discontinued Products still to be produced!





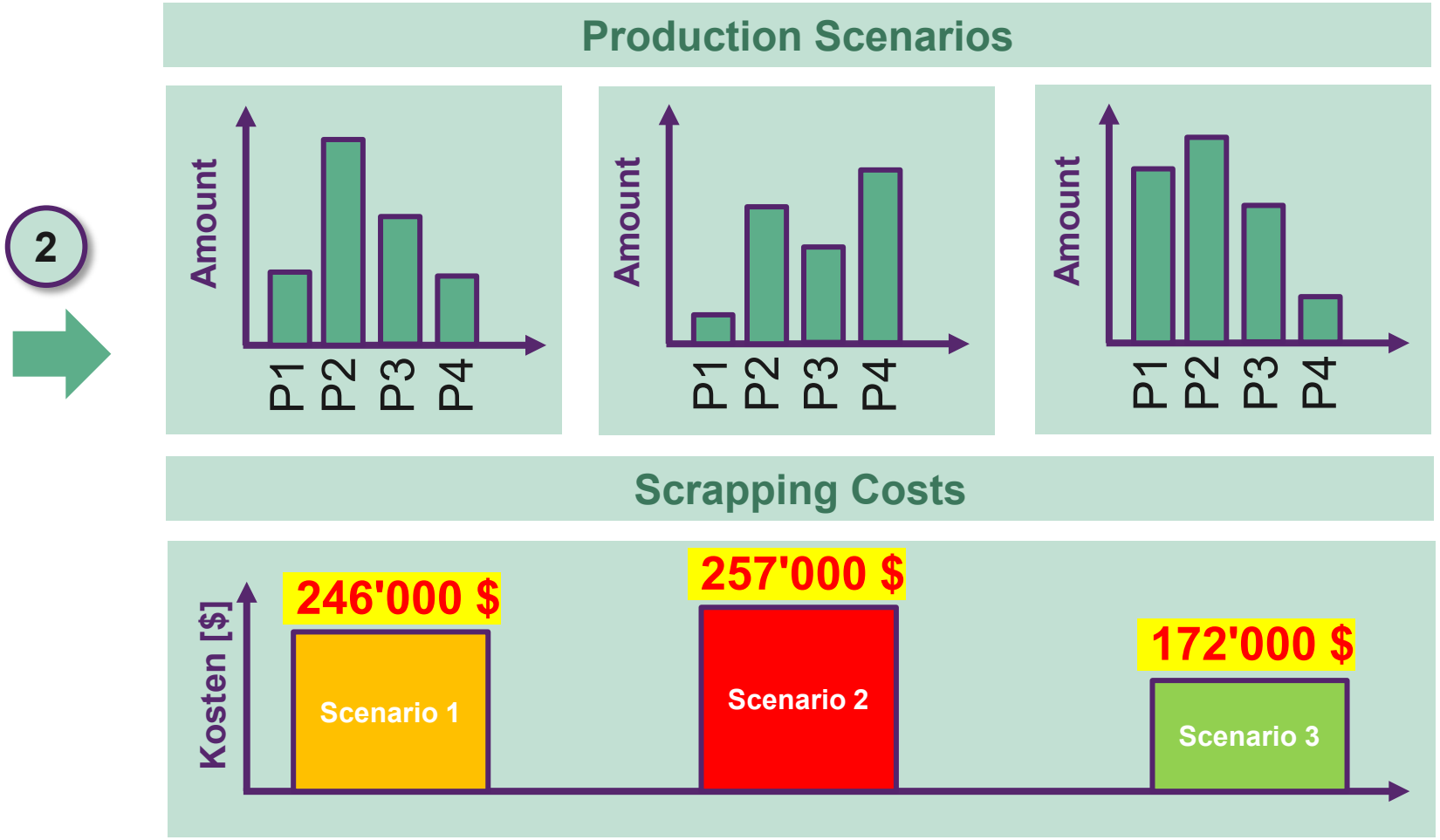
Parameters: Number of Discontinued Products still to be produced!



Product-management

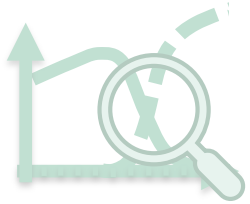
2

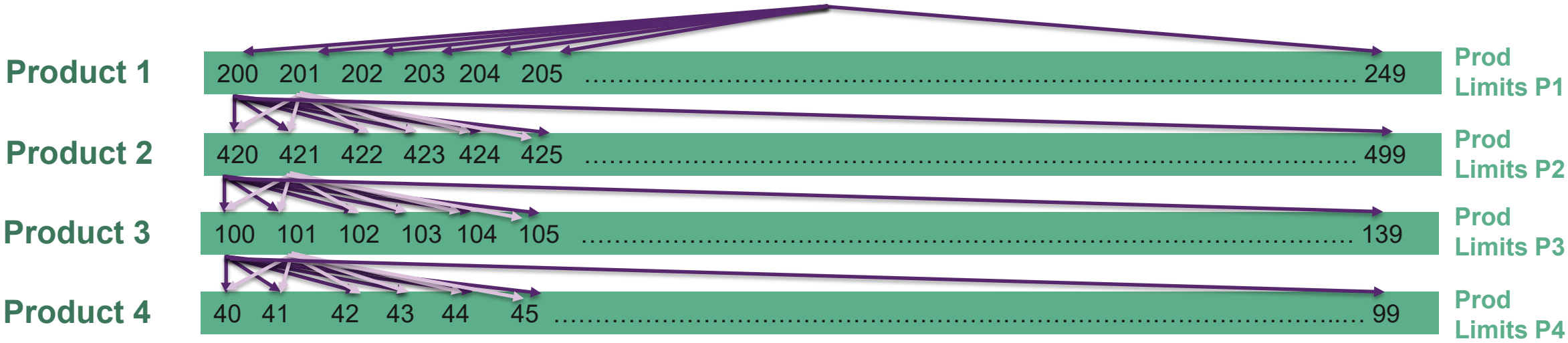
Marketing, Sales



OST

For which Scenario Costs will be minimal?





<u>Idea:</u> Calculate costs for all possible combinations...

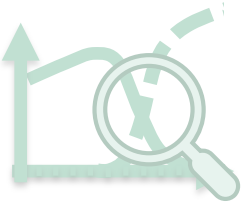
50 * 80 * 40 * 60 = 9.6 Mio possibilities! :(

OST

Mathematical Modeling

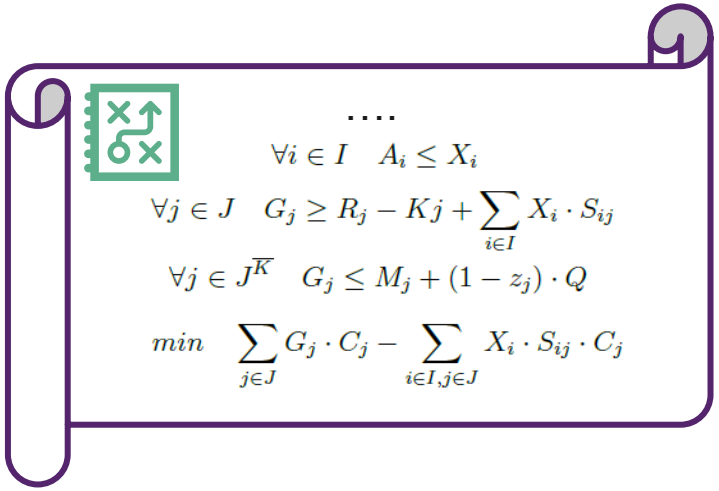
Dice, Justin Mathews, Link, CCA 3.0

Solution: Mathematical Programming

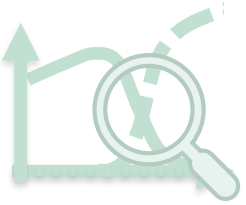


Mathematical Program
Translation of the optimization task including restrictions into mathematical equations, inequalities and objective function

Development of an Application



Solution: Mathematical Programming



Optimizer Tool can be used within Meetings between Product Management, Marketing and Sales to determine the amount of Products still to be produced:

- **Real-Time Scenario generation / evaluation**
- **Visualization of Scrapping Costs among Components involved**
- **Comparison between different Scenarios**

Result

- ☑ Reduction of scrapping costs of 20 – 30 %
- ☑ Increasing sustainability in the production process
- ☑ Reduction of waste and more efficient use of resources
- ☑ Ad-hoc calculation of scenarios and optimal solution

Optimizer Tool Demonstration

Pxhere.com, Link, CC0 Public Domain

OST

Thank you for your attention!

Contact: Fabian Leuthold (fabian.leuthold@ost.ch),
Scientific Programmer, Institute for Modeling and Simulation, OST

Reference: Oliver Mörl (oliver.moerl@leica-geosystems.com),
Director Global Supply & Demand Planning, Leica Geosystems