

# System Engineering @ QualySense Transition Experiences in a HighTech Startup

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Founded in 2010 in  
Zurich



One Mission



Tackle Sustainability  
Challenges via Technology  
and Innovation

Increase of Consumption, Increase of Waste  
Decrease of Resources, Quality Concerns



- Batch upgrade
- Spot counterfeit
- Automatic grading
- Purity and Purification





## QSorter® Explorer

- Inspection of samples / R&D
- Market entry in 2015
- Multiple installations in 3 continents
- Suitable for laboratory
- 30 to 50 seeds per second



NIR Spectroscopy



Machine Vision



Single Kernel Analysis  
& Sorting

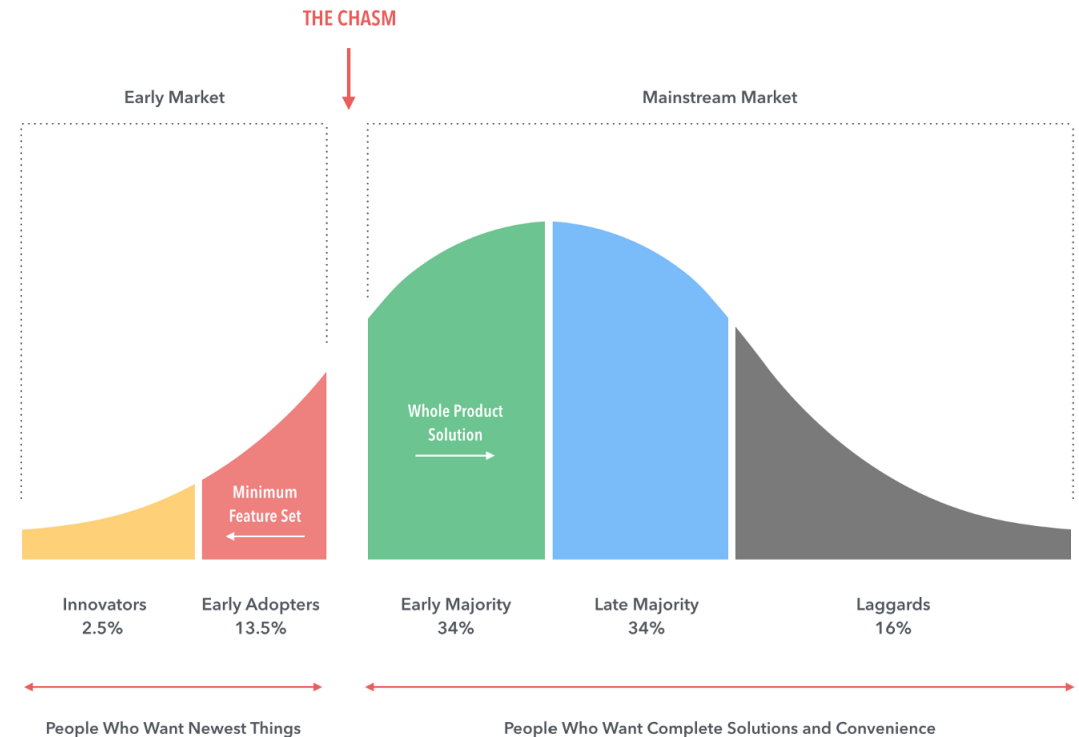


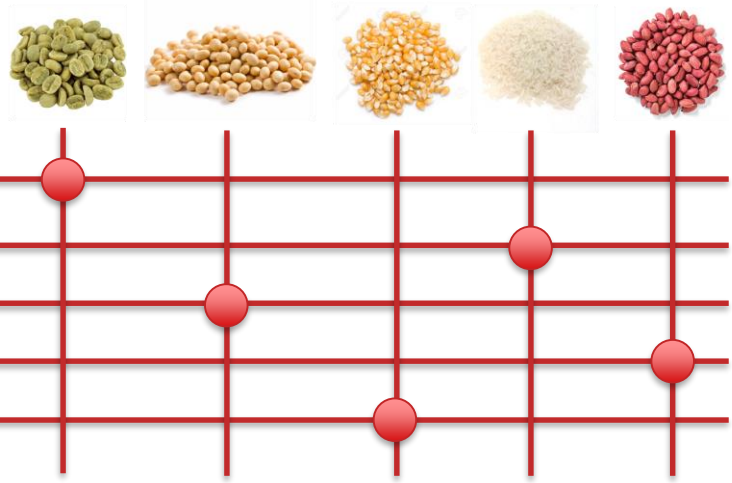
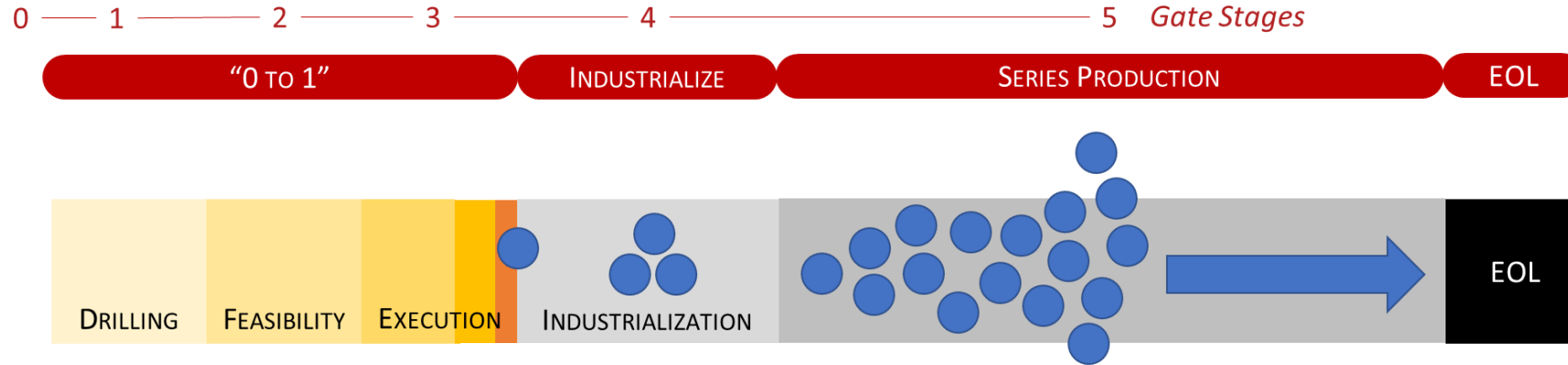
2020, +50 Devices  
 More Applications  
 New Product Line  
 More global  
 Global teams

2019, ~50 Devices  
 More Applications  
 Global Footprint  
 40 Employees  
 New Product Line

2017, Additional Devices  
 Various Applications in  
 Validation  
 20 Employees

2015, First Device Sold  
 QSorter Explorer





## Challenge 1

Go through the cycle fast with 1 Solution

## Challenge 2

Go through multiple cycles (more solutions)

## Challenge 3

Handle two robotic platforms at the same time



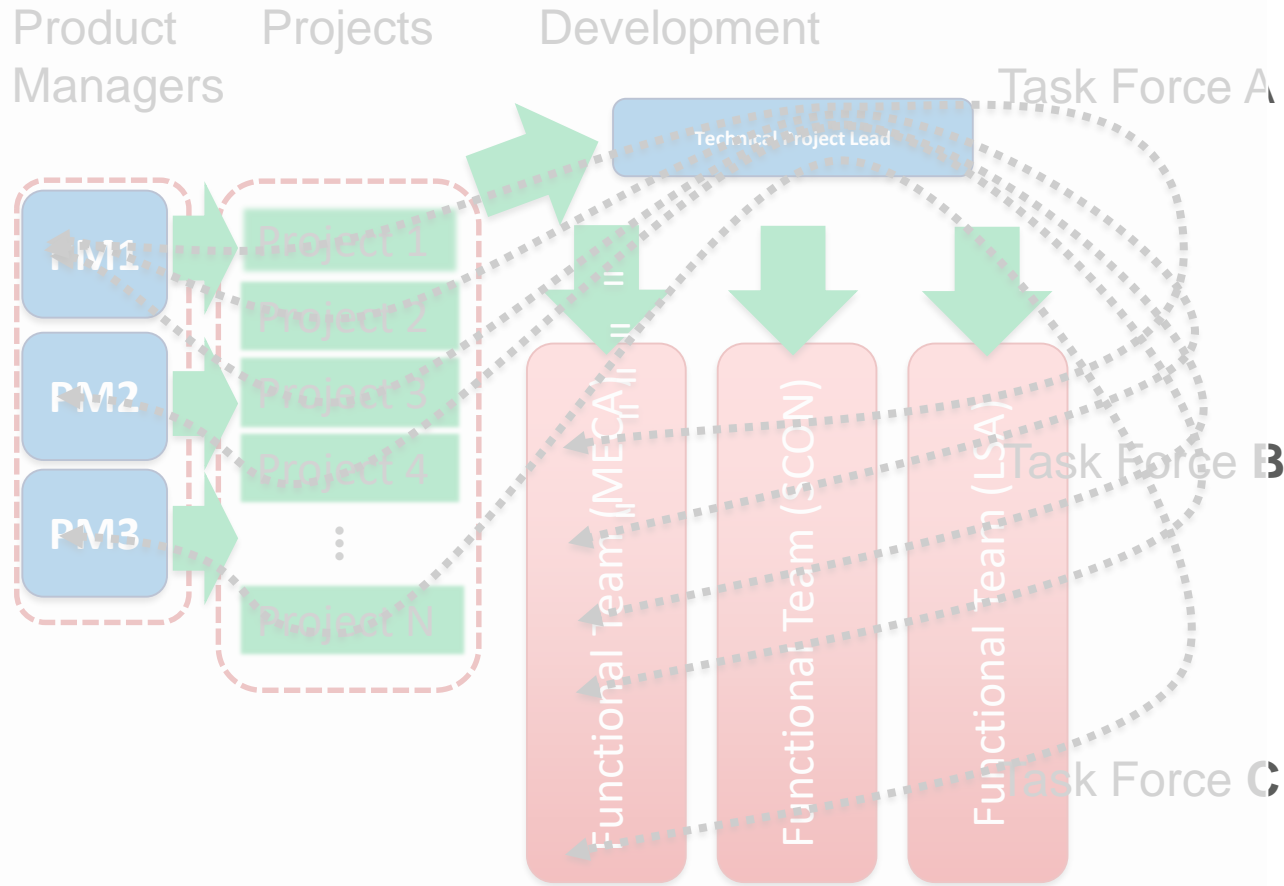
- Technological
  - Architecture
  - Modularity in Software and Hardware
  - Interfaces & Decoupling
  - Configurability
- **Organisational**
  - **Organisational Flip: Push → Pull**
  - **Requirements**
  - **Quality & Validation**
  - **Generalization**



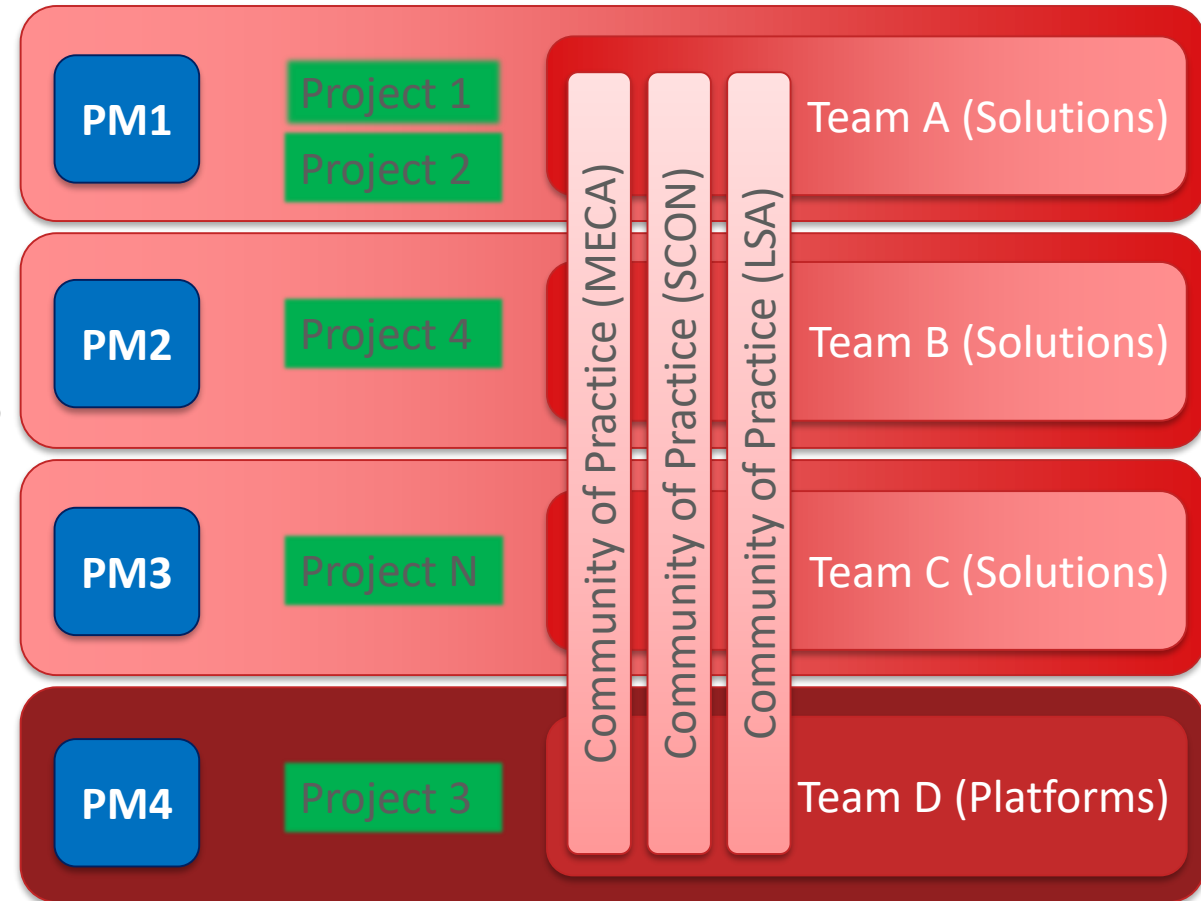
# Flipping the Organisation: Push → Pull



## Before: Unstructured



## After: SCRUM

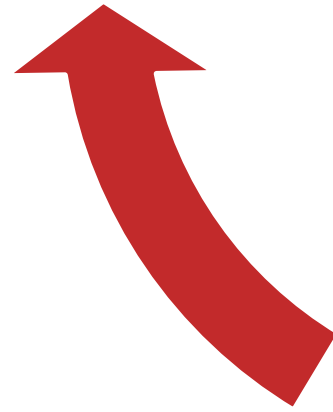




Content

Structure

Process





## Content

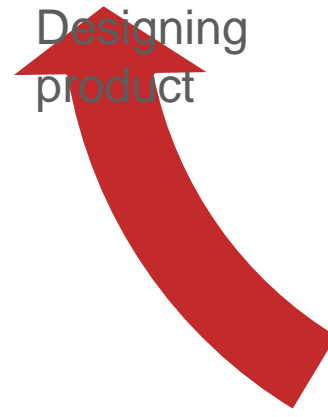
- Understanding what the customer really wants
- Designing the product

## Structure

- Customer requirements
- Product requirements

## Process

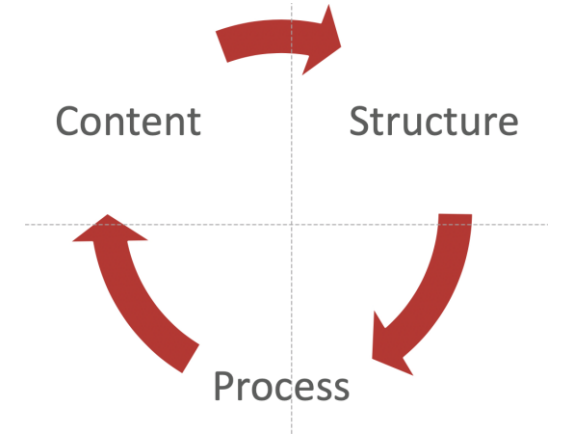
- Common repository: Sharepoint
- Change based on decisions: Checkpoints
- Keep everyone in the loop: Communication



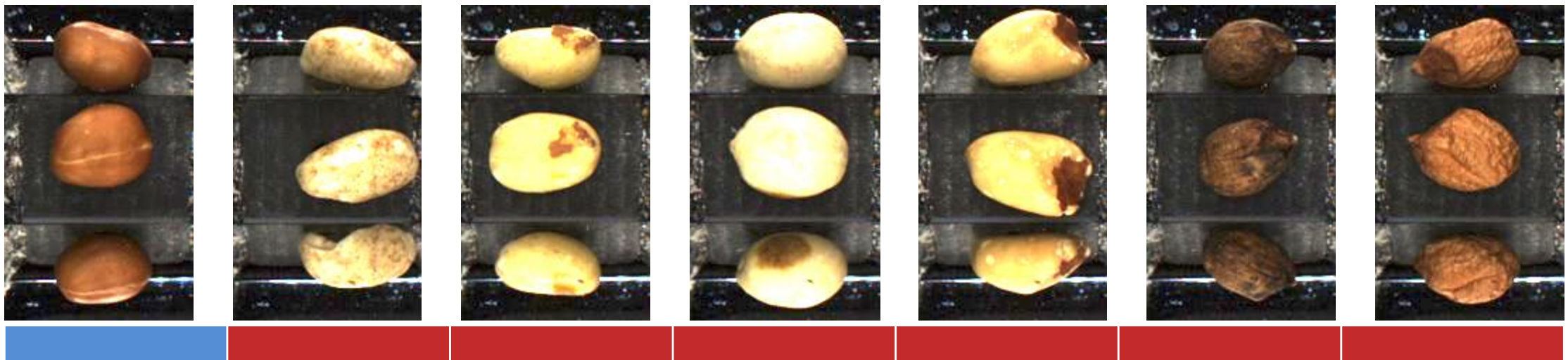




- Typical Example: Classification
  - What to you want to sort from what?
  - Vs: Two-class classification



non-defect	dirt	green	insect	discolor	mold	shriveled
774 peanuts	9 peanuts	32 peanuts	65 peanuts	4 peanuts	25 peanuts	38 peanuts



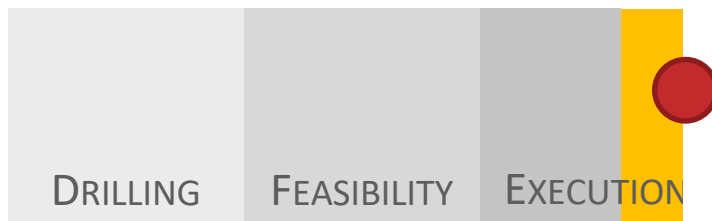


- Problems as mentioned in the introduction
  - Biological diversity of kernels
  - Degradation of kernels over storing time
  - Degradation through sorting
- Front-loading validation protocols
  - Validation is part of the sales process:
    - How is the customer validating ?
    - What customer processes are involved?
    - Consequently how are we validating?
  - Connecting validation with requirements
- Process
  - Ensuring validation is performed before delivery





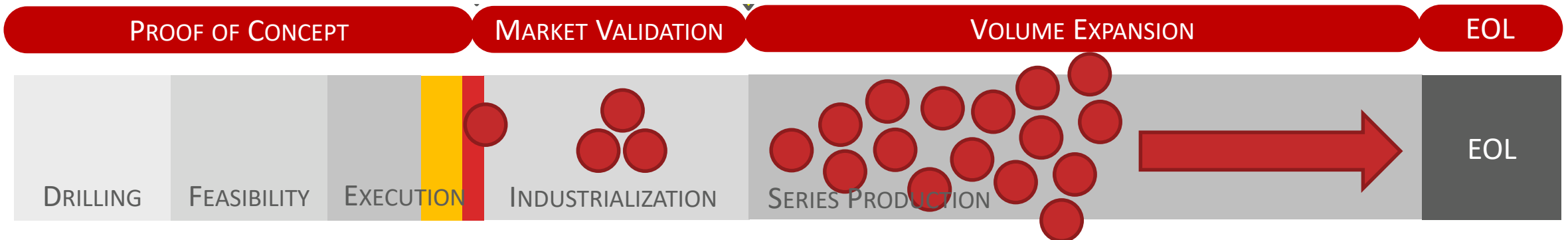
PROOF OF CONCEPT





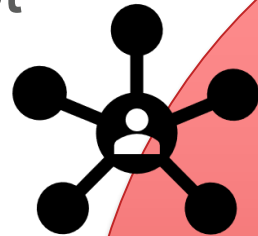
Aim: Establish a clear distinction between proof of concept, market validation, and volume expansion.

- For **proof of concept** focus on market, clarity of questions and make sure problem solved is reproducible.
- For **market validation**, validate that product scales in the market without major modifications
- For **volume expansion** establish processes, plan and perform integration tests and product validation





Better product structure



Faster Solution Development

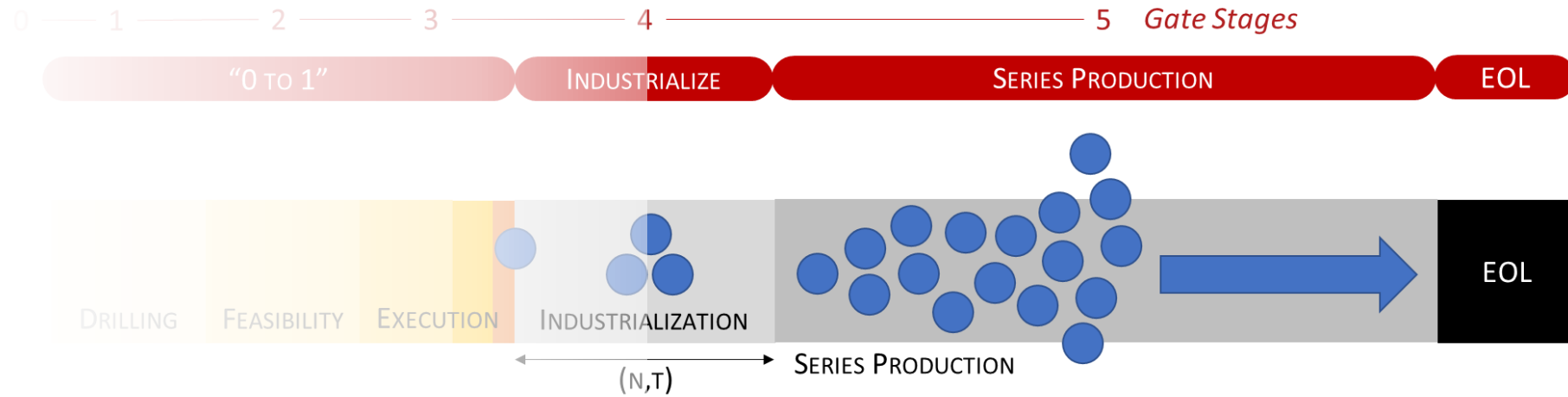


Agile Department Structure with Customer Focus



Platforms to support multiple use-cases





Faster product and market validation is allowing us to put larger number of machines on the field.

Our Organizational Focus:

- Manufacturing capabilities
- Logistics
- Servicing



## AUTOMATED QUALITY INSPECTION



High Accuracy & Reliability  
High-Throughput  
Integration to other Systems

## LARGE VOLUMES PROCESSING



Quasi-Lab Scale Accuracy  
High-Volume  
BigData & Reporting



- Pragmatic Solutions
- PTA
- QualySense



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Questions?  
Thank You!