Transformation to a data-driven organization

Jan Spijkerman & Justin Lambeck

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Manufacturing IT

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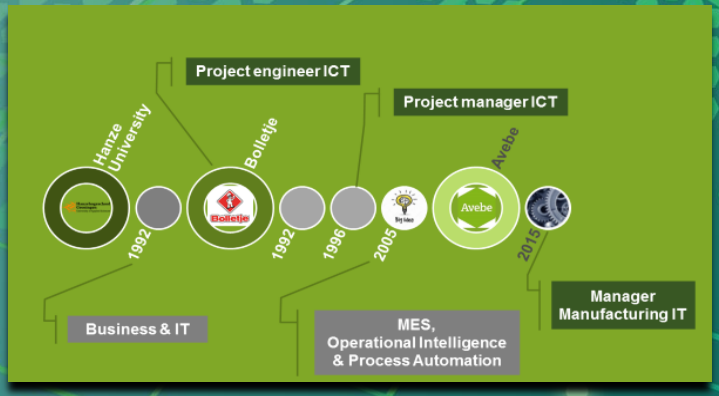

Justin Lambeck

Engineer
Manufacturing IT

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- Chemical Engineering Background
- Since August 2018 @ MIT
- Application contact / Admin for the PI System & TrendMiner

Avebe 100 YEARS

Innovation by nature
since 1919

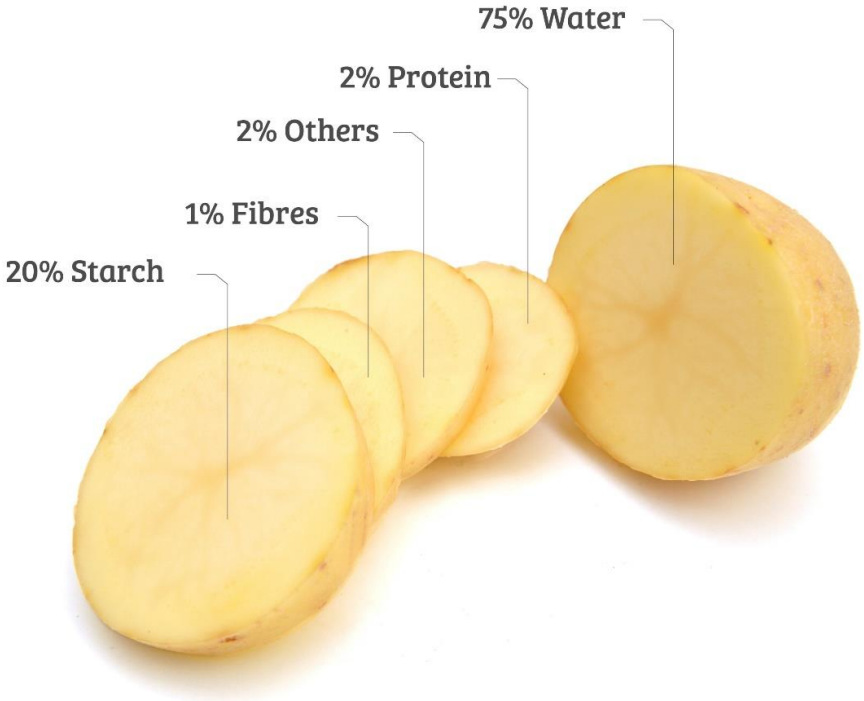
www.avebe.com

Short introduction movie

About us

- Established in 1919
- An international cooperative of starch potato growers
- Approximately 2300 members
- HQ in Veendam, the Netherlands
- Production facilities in Northwest Europe
- Global sales organisation
- Approximately 1326 employees worldwide

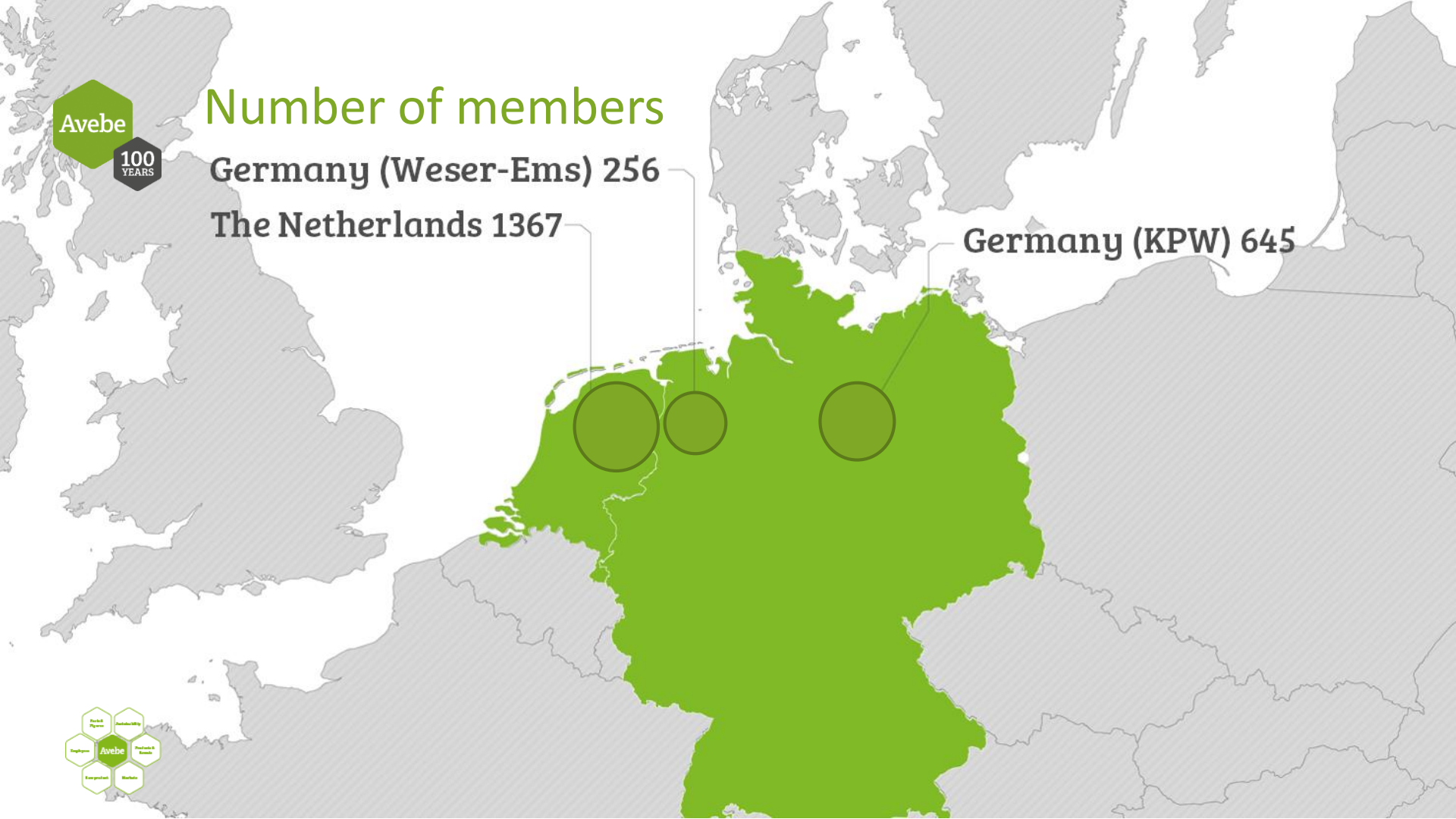
We extract everything to be had



Key figures

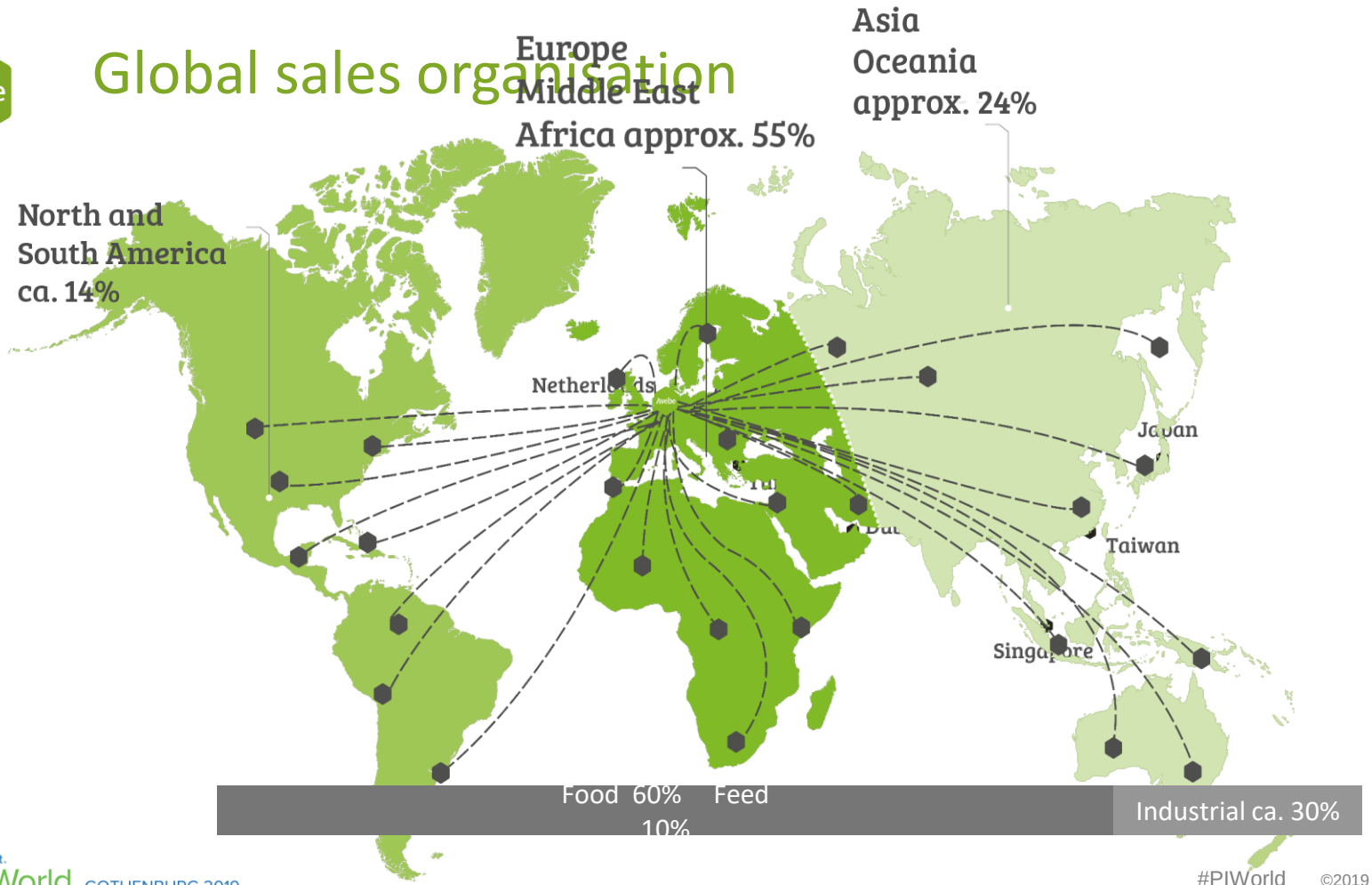
Year	2017/2018	2016/2017	2015/2016
Net turnover (in millions of euros)*	**576.6**	551.3	548.6
Performance price (EUR/ton)*	**85.81**	82.16	77.10
Solvency	**43.6%**	49.0%	48.8%

Number of members



Our production sites

Global sales organisation



Our markets

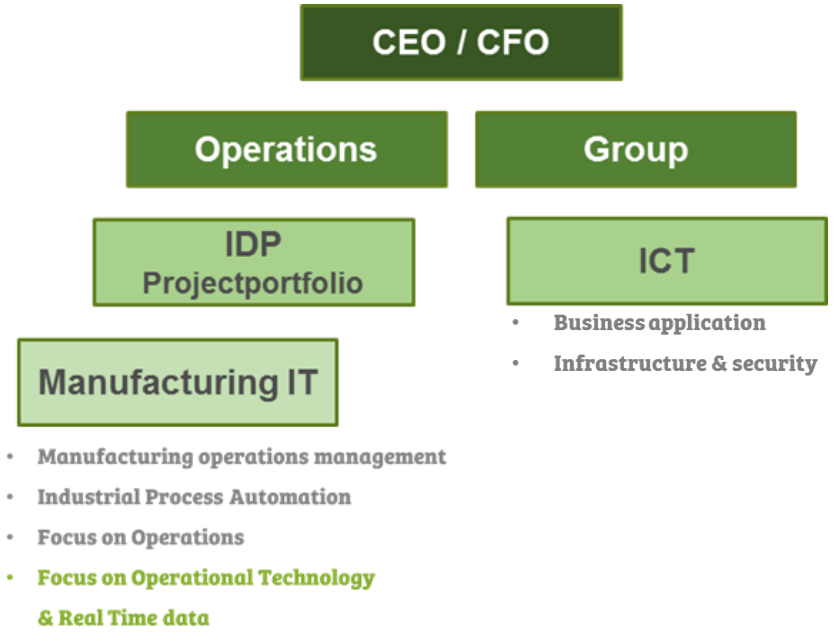
Over two-thirds of our ingredients are sold worldwide in the food industry

Market - Food Ingredient Solanic

- Potato protein
- Vegetable proteins
- Non-allergenic, free of GM materials, clean label, gluten-free
- Very high nutritional value
- Vegetarian, vegan, kosher & halal, sustainable

Manufacturing IT

Manufacturing IT



Mission

*"Be a reliable & high valued **business partner** for Operations as well as being the **competence center** for Manufacturing IT within Avebe"*

Vision

*"To run a high value adding operation to **raise the maturity level of process automation** and **operational intelligence** within Avebe Operations with consistent high quality in which people, innovation and internal & external partnerships can **flourish**"*

Manufacturing IT

Responsibilities

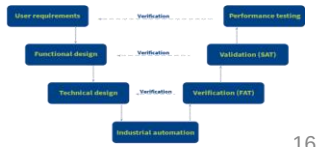
- Responsible for reducing the risk for production failure due to IA.
- Responsible to support Operations to increase OEE and lower costs.
- Responsible for co-developing a long term ‘Factory 4.0’ vision. Focussed on Industrial Automation, but meaning more than just IA alone.
- Responsible for support & improvement on current IA,Tools & production processes.
- Responsible for quality of IA which will be an essential part of current & future strategic projects.

Competences

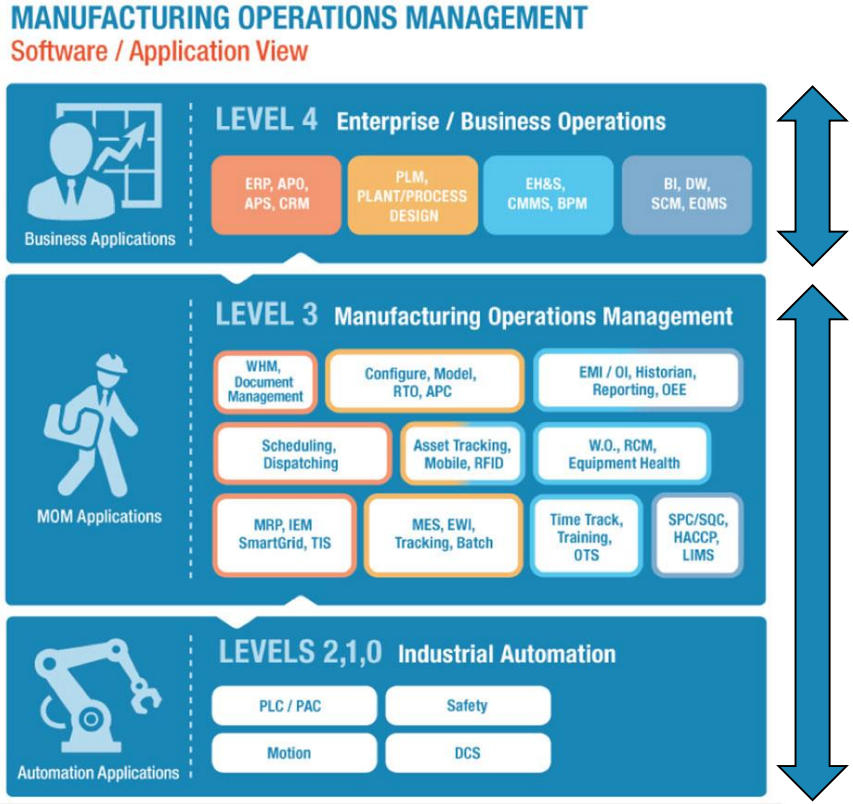
1. Strategy / Architecture	2. Compliancy / Security	3. Innovation
• Vision & strategy • Standardization • Organisation (recruitment) • Training / Education • Advise • Implementation	• Cyber Security • Validation • Auditing • Standards • Advise • Implementation	• New trends • New applications • New technics • Knowledge / Partnerships • Implementation

4. Management / support	5. Projects / Modifications
• Service Desk • Applicationmanagement • Contract management • Licence management • Patch Management • Advise • Implementation	• User requirements (PVE, URS, ..) • Basic / detail engineering (FDS, SDS, ..) • Review • Quality audits (FAT, SAT,..) • Implementation/Go Live

V-model



Manufacturing IT department



ICT

Manufacturing IT

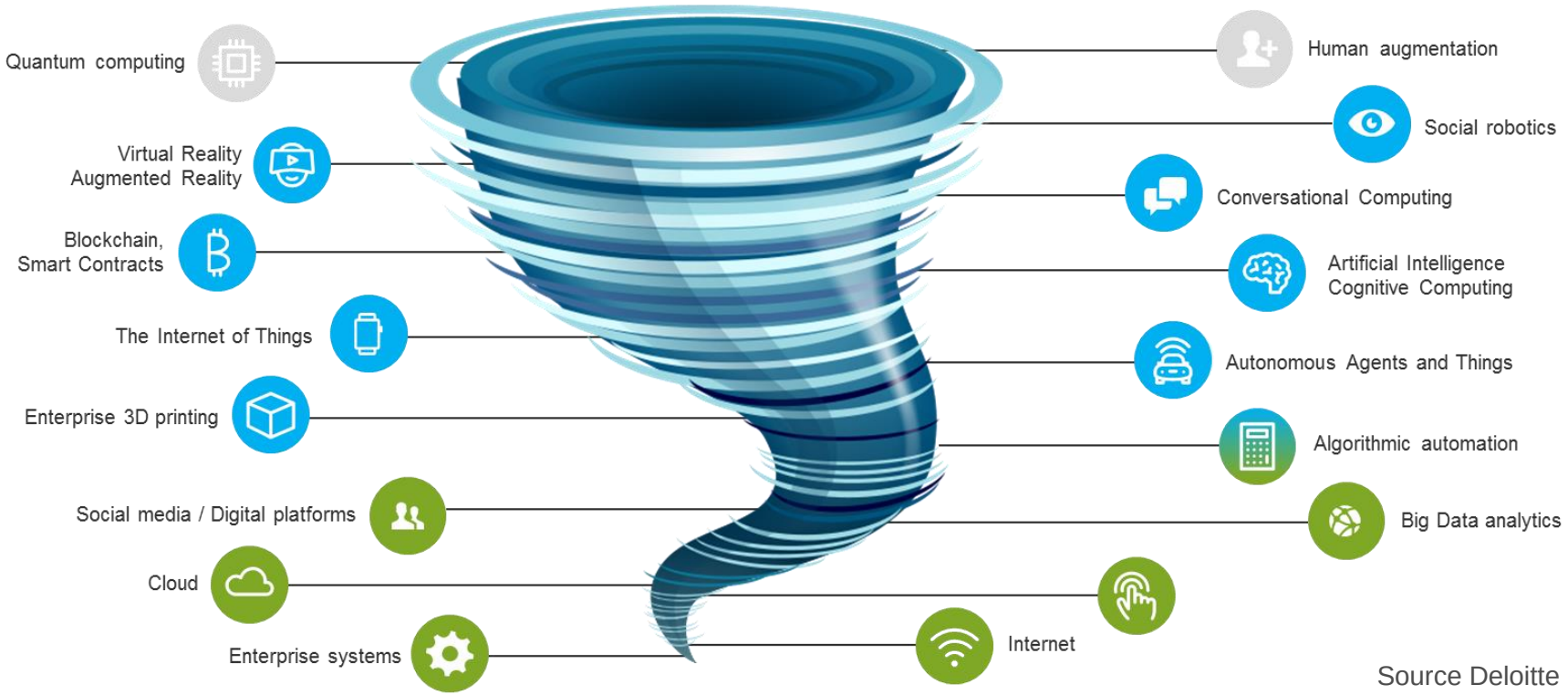
Factory4.0 - a data-driven organization

The technology storm is developing

> 10 years

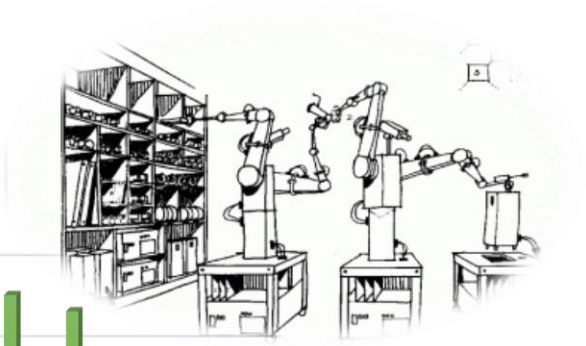
2-10 years

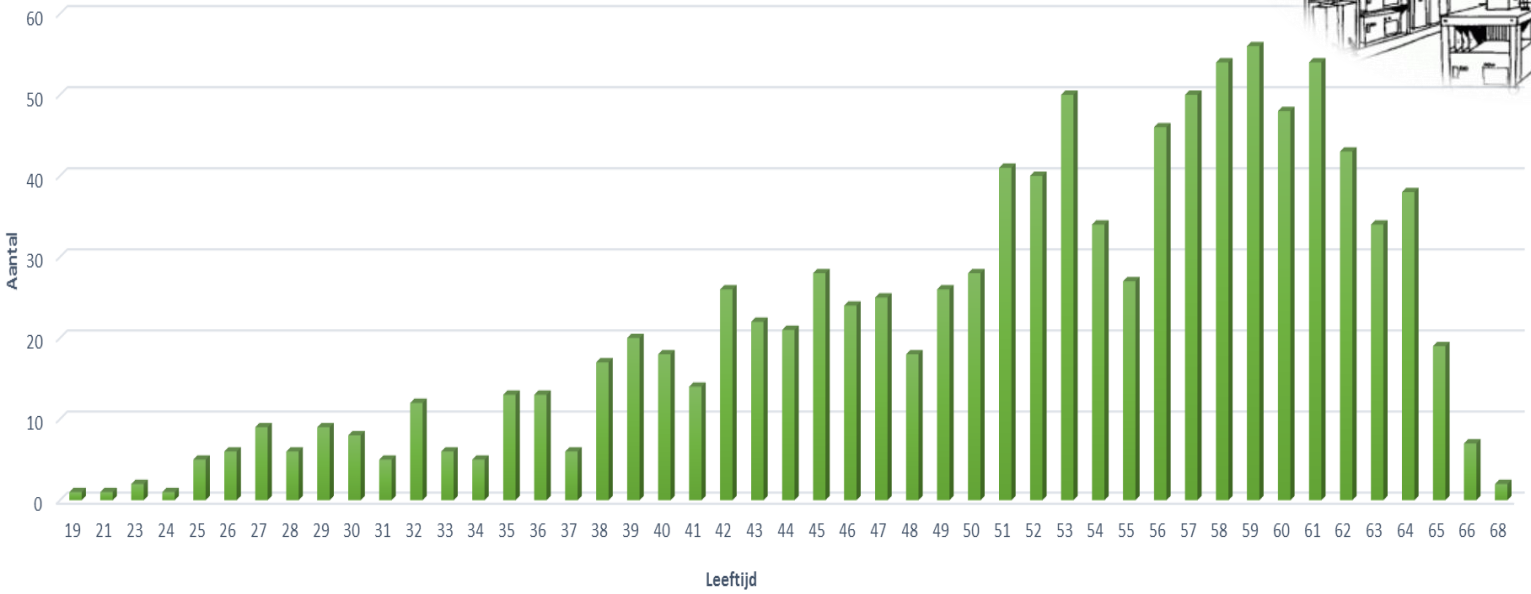
Past 20 years



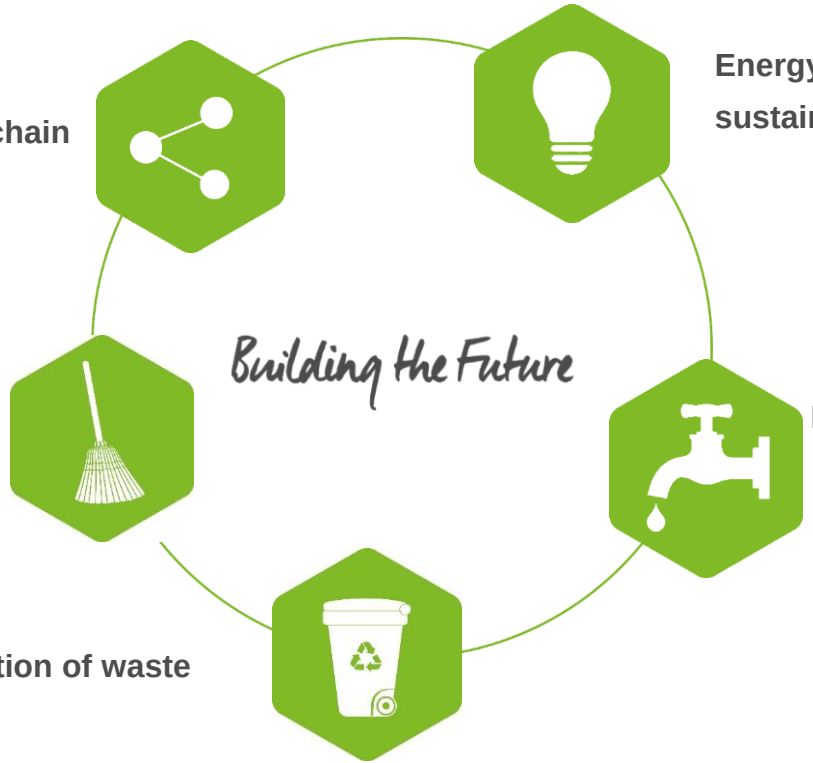
Source Deloitte

Ageing of Avebe employees





Sustainability themes



Energy: savings and sustainable

- By 2023, we will reduce 12% of the greenhouse gas emissions by:
  - Energy efficiency
  - Sustainable sourcing
  - Reduction of road transport

Reducing water consumption

- By 2023, we will:
  - Use 20% less water per ton processed potato
  - Re-use 40% of the water within potato as process water

The Operations strategy 2023 is founded on 5 main strategic pillars

Vision

"To run a sustainable, value adding operation with consistent high quality in which people and innovation can flourish"

Enforce the basics
- QESH standards & focus
- Continuous process development
- Maintenance systems
- Project management capabilities

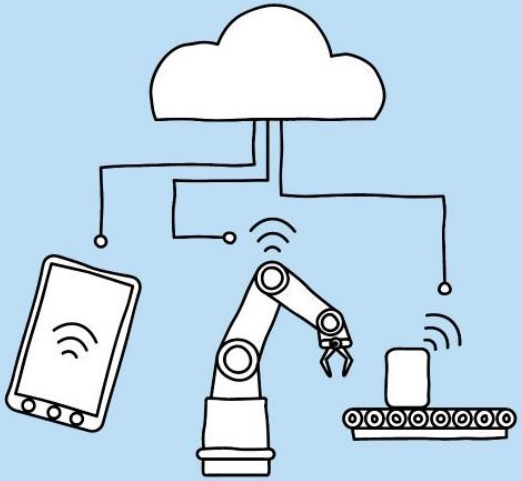
Innovate product & processes
- Implementation capability for product & technology innovations
- Strengthen license to operate (in food)
- Build strategic partnerships

Operational excellence
- World Class Operations program
- Value Driven Maintenance program
- Enforce KPI structure
- Activate insights from MES and data collectors

Sustainability
- Strive for minimal water usage & CO_2 footprint
- Establish clean label processes

Build proactive Organisation
- Create an active and venturous culture among employees
- Strive to be one-step ahead of regulations
- Strive to become best and safest place to work
- Define changes for future job positions

Factory4.0 a data-driven organization



Industry 4.0

The 'Smart Factory'. Autonomous decision making of cyber physical systems using machine learning and Big Data analysis. Interoperability through IoT and cloud technology.

Factory4.0 a data-driven organization

Vision

Operational Intelligence — Building a data-driven organization to increase overall productivity & quality

Process Automation — Building reliable systems and highly automated production-lines to increase overall productivity & quality

People — Trained and skilled people who are able to work with highly automated production-lines and to use new technologies to increase overall productivity & quality

Pilots4.0 — Discover and learn new technologies

Factory4.0 a data-driven organization

From average performance to **World Class Operations Management**

Business Drivers

- Reduce operating costs
- Reduce utilities usage
- Reduce quality costs
- Increase capacity
- Increase throughput and yields
- Reduce business risk

Factory4.0 a data-driven organization

Operational Intelligence

The **accessibility** of data is paramount for

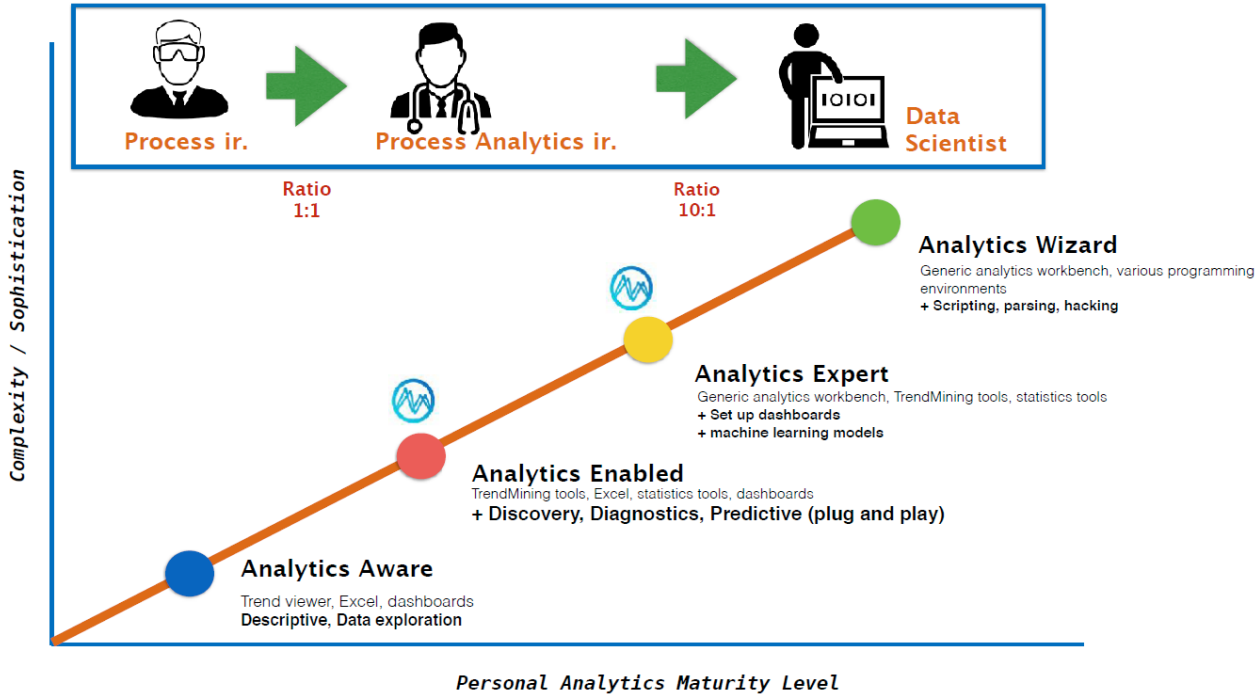
informed decision making

at all levels of **business**

Factory4.0 a data-driven organization

What's the plan?

Operational Intelligence



Step 1

We have to develop the **next generation** process engineers

Step 2

We have to develop the **next generation** maintenance engineers

Step 3

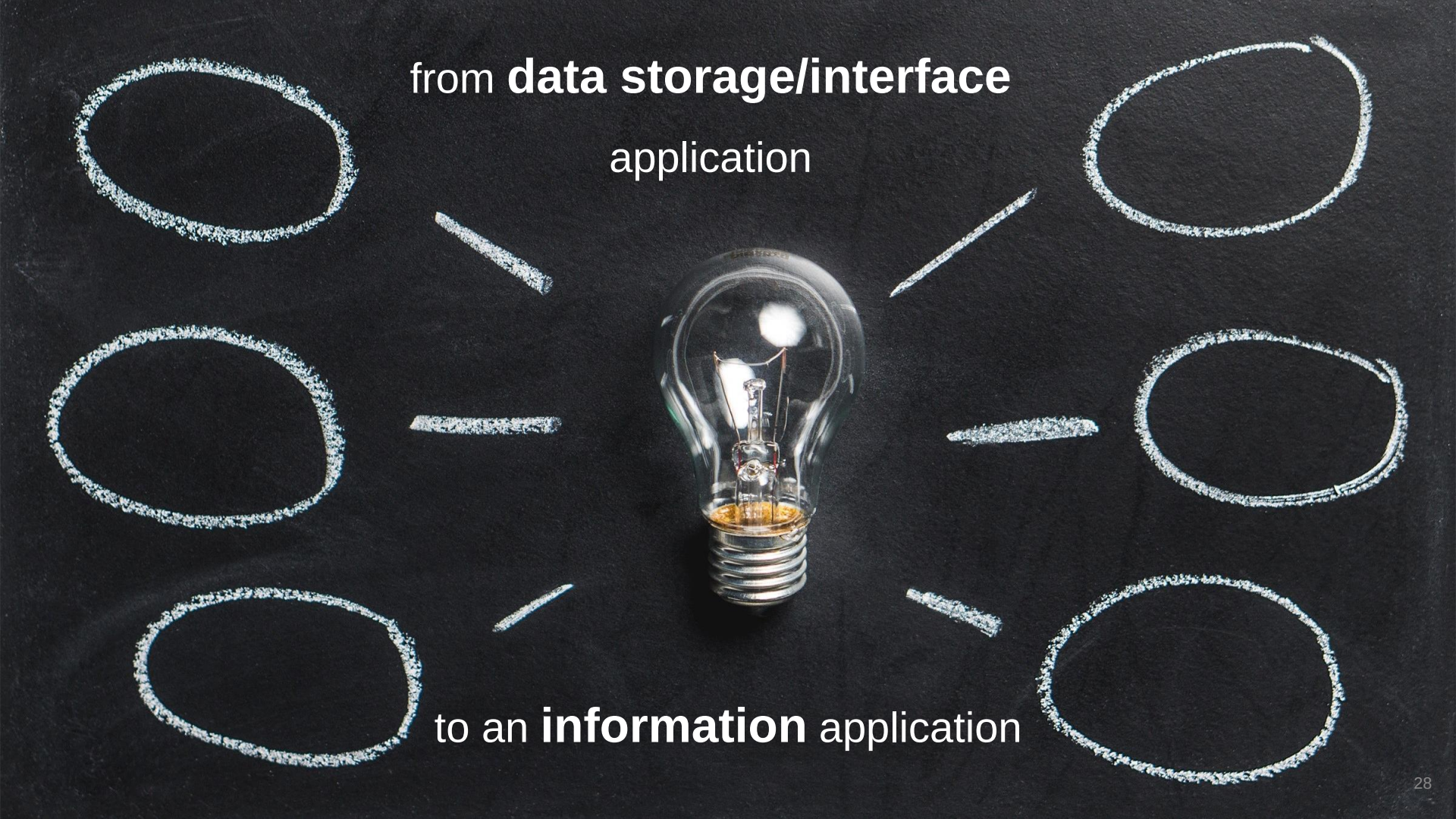
We have to develop the **next generation** Operators

Step 4

the **next generation** … or **new** …

from **data storage/interface**

application



to an **information** application

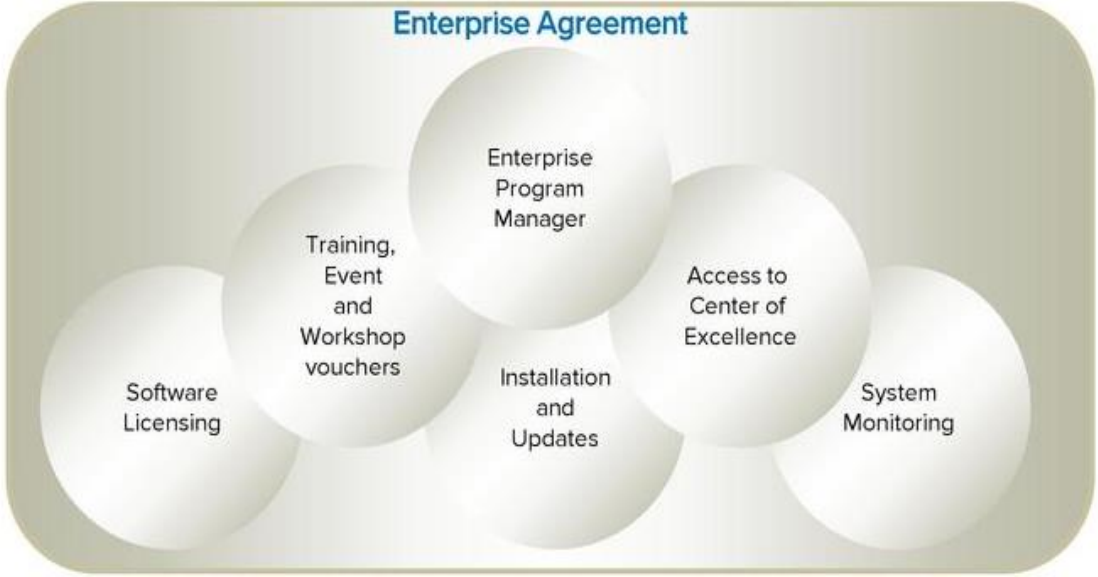
Factory4.0 a data-driven organization

Operational Intelligence

Build Strategic Partnerships

Factory4.0 a data-driven organization

Exploring the Enterprise Agreement



Digital Transformation in Production: Site Survey Review

Justin Lambeck, Jan Spijkerman
Tjeerd Zwijnenberg, David Hoven, OSIsoft

April, May 2019

Opportunities for Avebe

Loss Prevention & Asset Health

- Increase asset uptime
- Reduce give-away (more water and less protein & starch in product)
- Reduce starch, protein & fiber content in waste water
- Reduce re-work

Process Productivity

- Optimize usage of chemicals
- Strengthen operational optimization capabilities
- Improve data capturing & data visibility across departments

Energy Efficiency & Water Usage

- Improve situational awareness regarding energy, CO2 & water consumption across departments
- Expand energy mgmt. capabilities

Quality Mgmt.

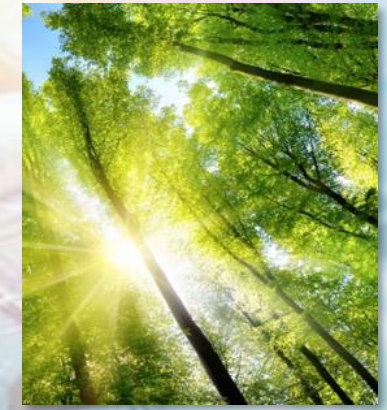
- Integrated system for production-, quality- & release-related data
- Quality aspects in OEE
- In-process quality prediction

Talent Acquisition & Retention

- Capability & knowledge sharing
- Enable resources by leveraging modern tools appropriately

See how others did:
Improve energy efficiency

A larger paper milling customer:
Saved roughly **6M$** by analyzing energy and steam consumption at sites



North American Mining company:
Reduced energy spent across all sites **by 1%**

Avebe

Value

Cost

Decision

In Practice

Architecture

Process Automation – Up to date automation systems & standardization at plant level

SIEMENS

PI SYSTEM OSIsoft.

TrendMiner

HMI / Batch

Wonderware System Platform

System 800xA ABB

Proficy Plant Applications

ProLeiT Plant i.T.

PLC / DCS

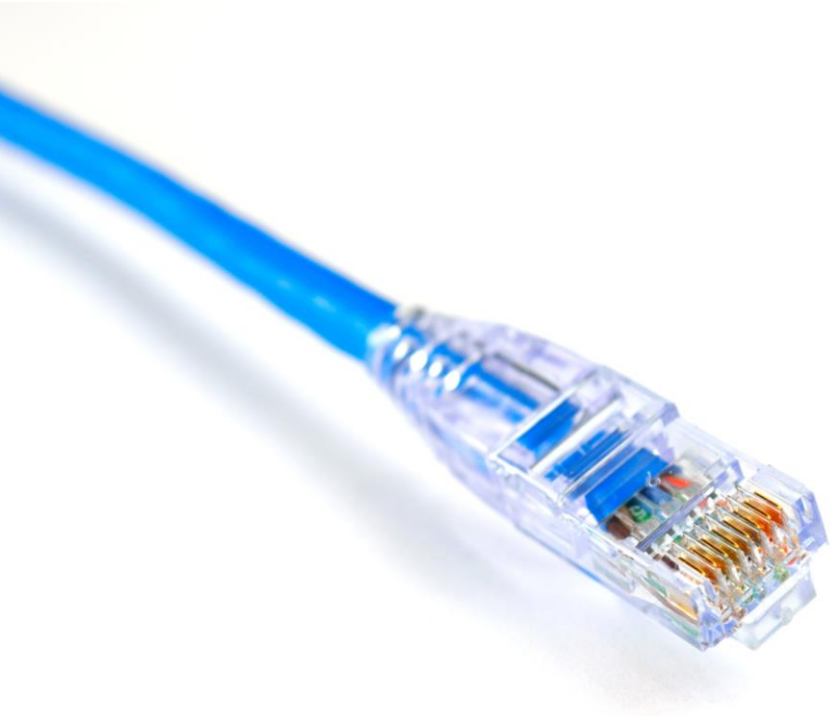
Honeywell
THE POWER OF CONNECTED

Rockwell Automation
Allen-Bradley • Rockwell Software

ABB

Foxboro by Schneider Electric

SIEMENS Ingenuity for life



The PI System as

- an interface between process automation
- an historian server for data collecting
- main platform for Operational Intelligence

TrendMiner

- an important additional tool for self service (visual) analytics

Current status PI system

~200 users

3 client applications

~65.000 tags

18 interfaces

DAL	LUC	MMO	FOX	TAK	GNV	INNO
0%	0%	75%	75%	75%	30%	0%
		3K tags	7K tags	39K tags	7K tags	

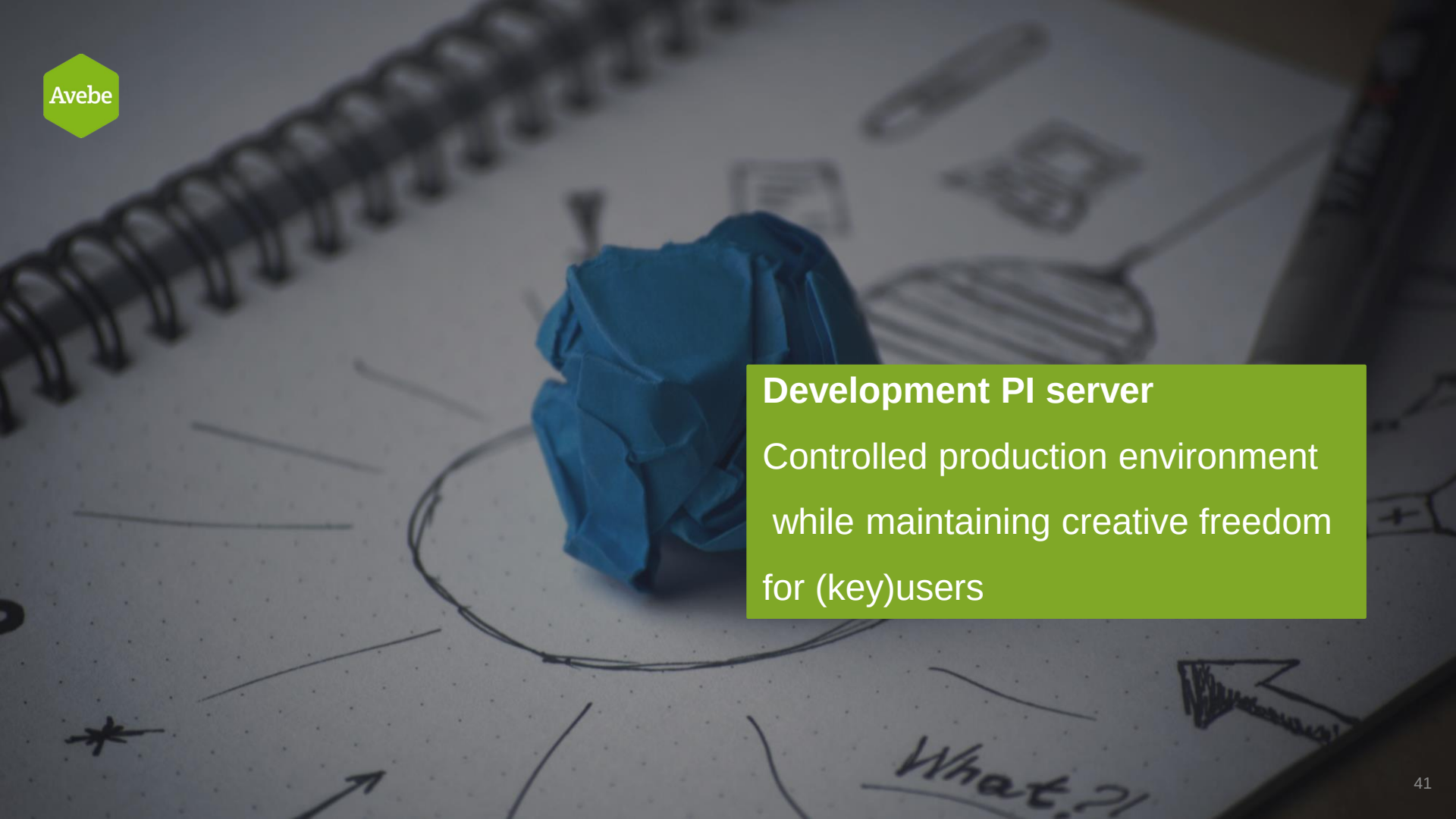
Knowledge Sharing

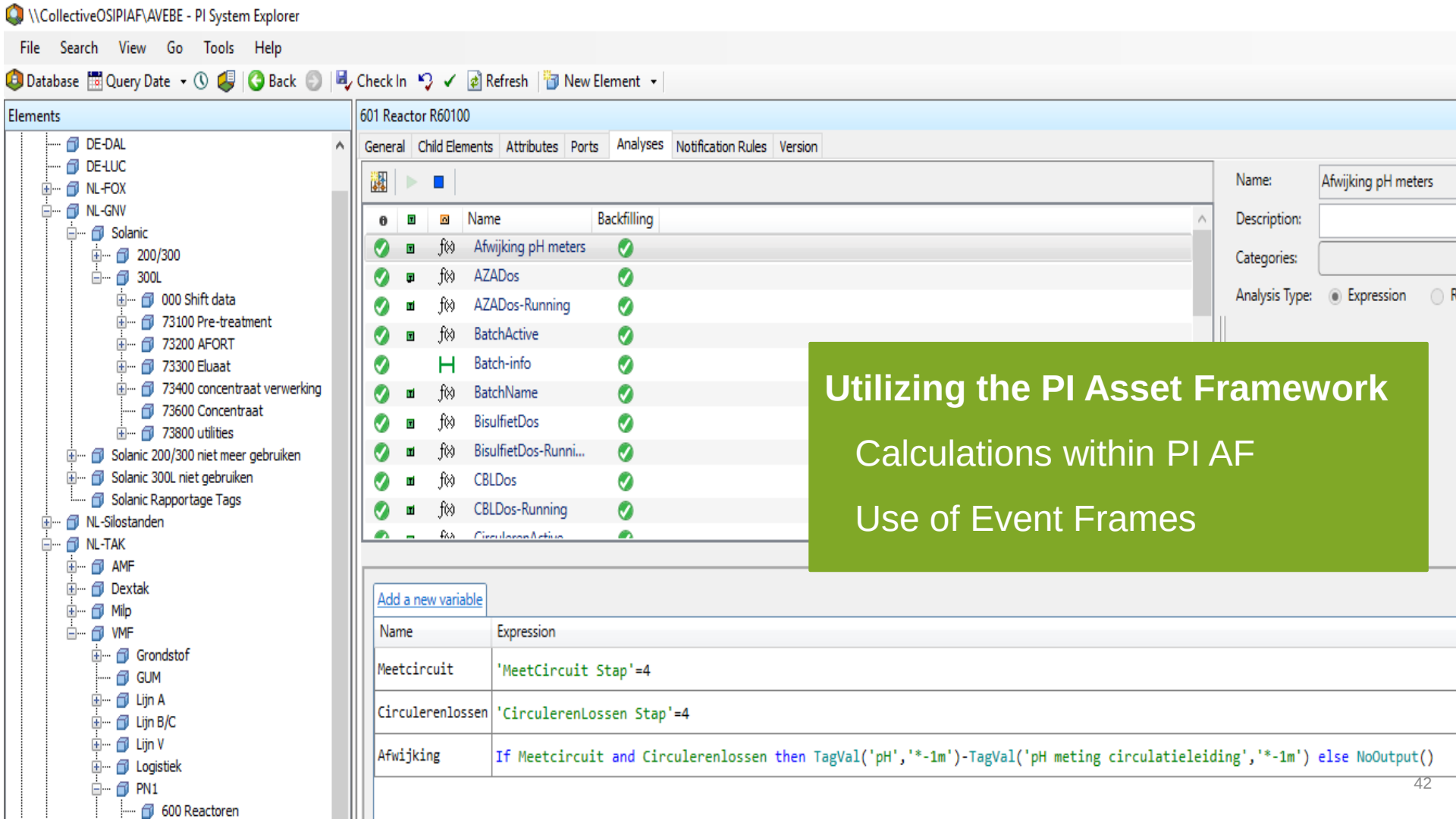
In-house training sessions for users

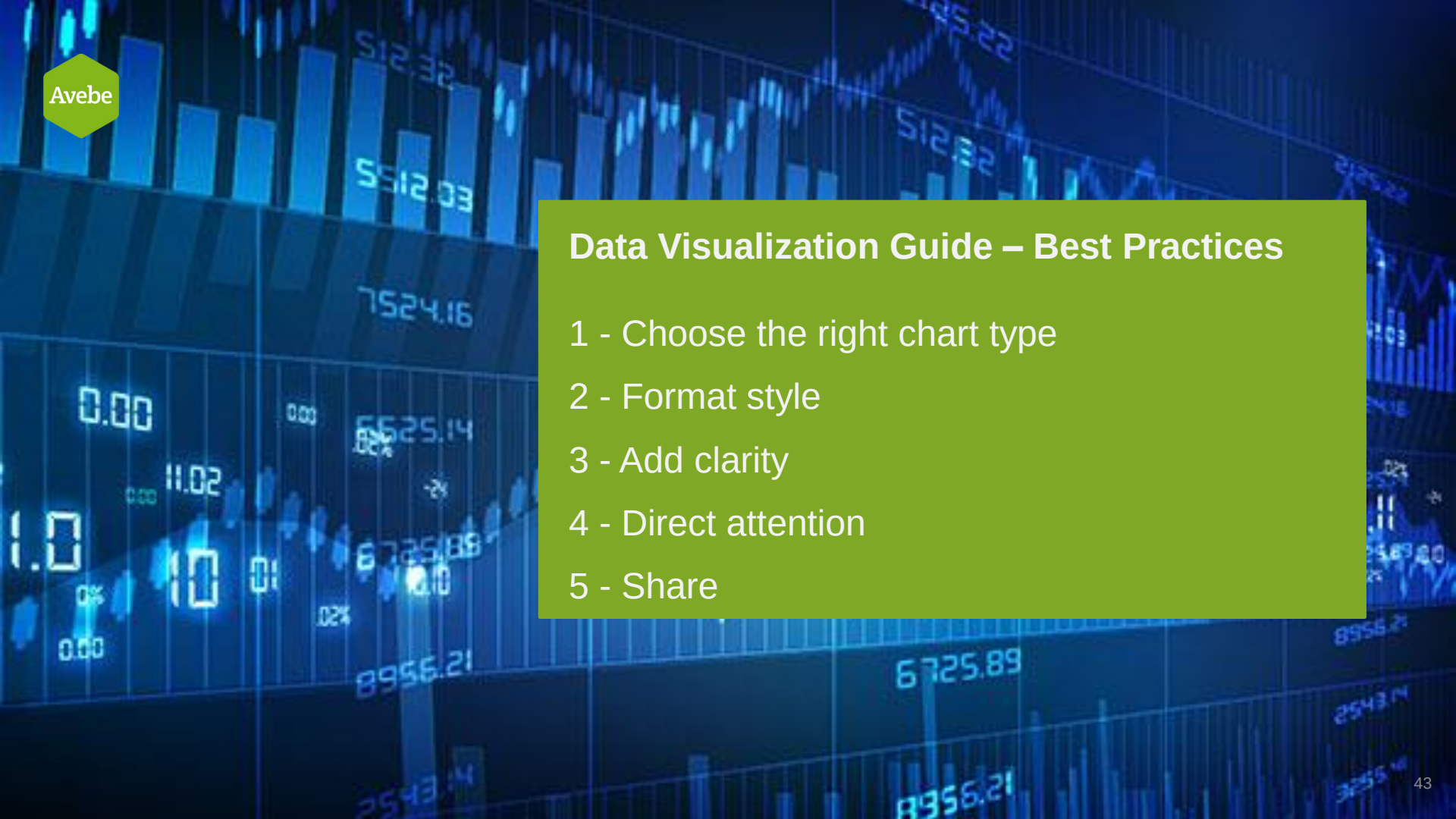
&

Avebe/OSIsoft PI User conferences

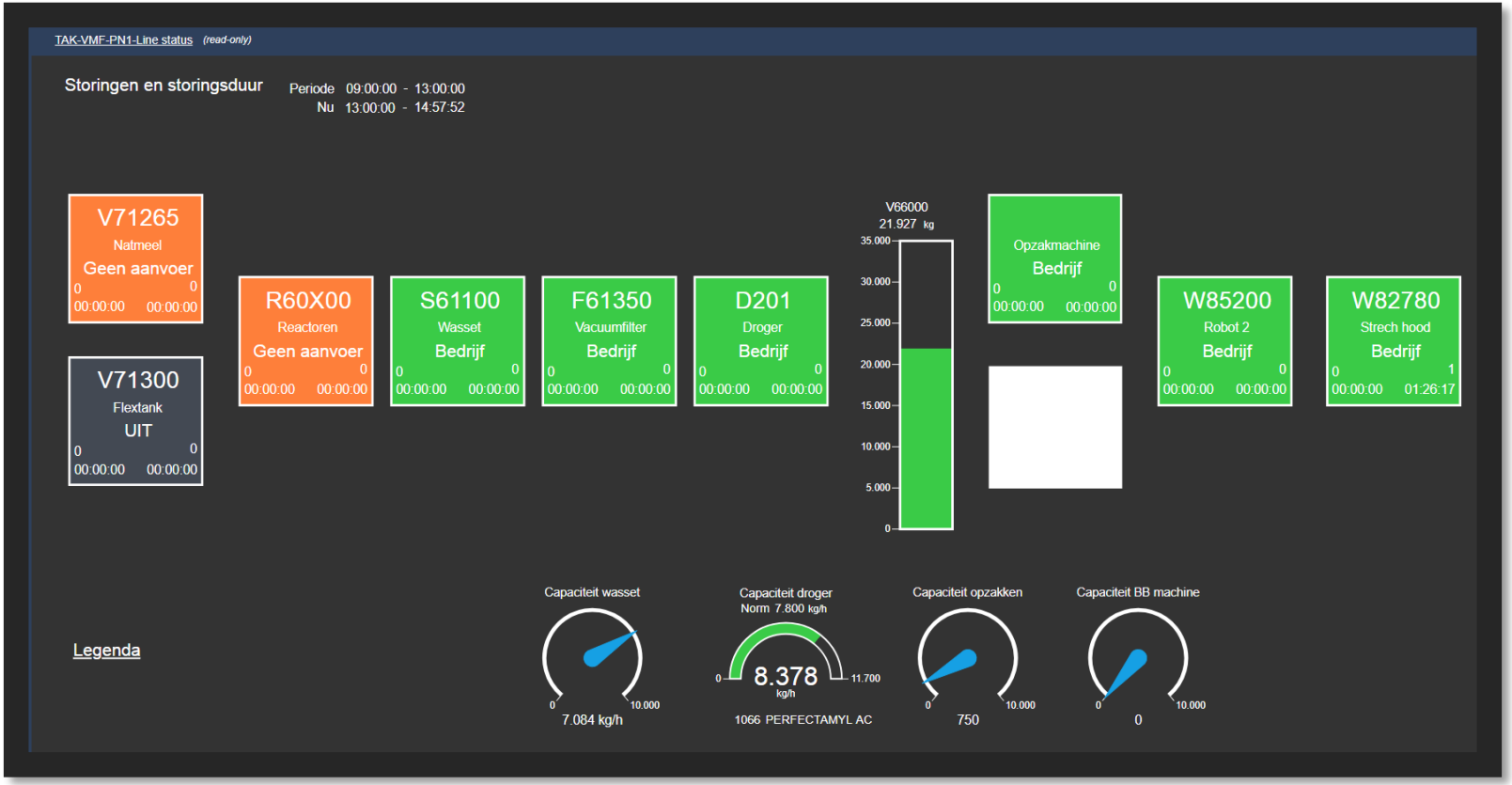
Modelling of the Asset Framework in scope for new plants/projects


Avebe
Development PI server
Controlled production environment
while maintaining creative freedom
for (key)users
What?!


\\CollectiveOSIPIAF\AVEBE - PI System Explorer
File Search View Go Tools Help
Database Query Date Back Check In Refresh New Element
Elements
DE-DAL
DE-LUC
NL-FOX
NL-GNV
Solanic
200/300
300L
000 Shift data
73100 Pre-treatment
73200 AFORT
73300 Eluaat
73400 concentraat verwerking
73600 Concentraat
73800 utilities
Solanic 200/300 niet meer gebruiken
Solanic 300L niet gebruiken
Solanic Rapportage Tags
NL-Silostanden
NL-TAK
AMF
Dextak
Milp
VMF
Grondstof
GUM
Lijn A
Lijn B/C
Lijn V
Logistiek
PN1
600 Reactoren
601 Reactor R60100
General Child Elements Attributes Ports Analyses Notification Rules Version
Name Backfilling
Afwijking pH meters
AZADos
AZADos-Running
BatchActive
Batch-info
BatchName
BisulfietDos
BisulfietDos-Runni...
CBLDos
CBLDos-Running
Name: Afwijking pH meters
Description:
Categories:
Analysis Type: Expression
Utilizing the PI Asset Framework
Calculations within PI AF
Use of Event Frames
Add a new variable
Name Expression
Meetcircuit 'MeetCircuit Stap'=4
Circulerenlossen 'CirculerenLossen Stap'=4
Afwijking If Meetcircuit and Circulerenlossen then TagVal('pH','*-1m')-TagVal('pH meting circulatieleiding','*-1m') else NoOutput()


Avebe
Data Visualization Guide – Best Practices
1 - Choose the right chart type
2 - Format style
3 - Add clarity
4 - Direct attention
5 - Share

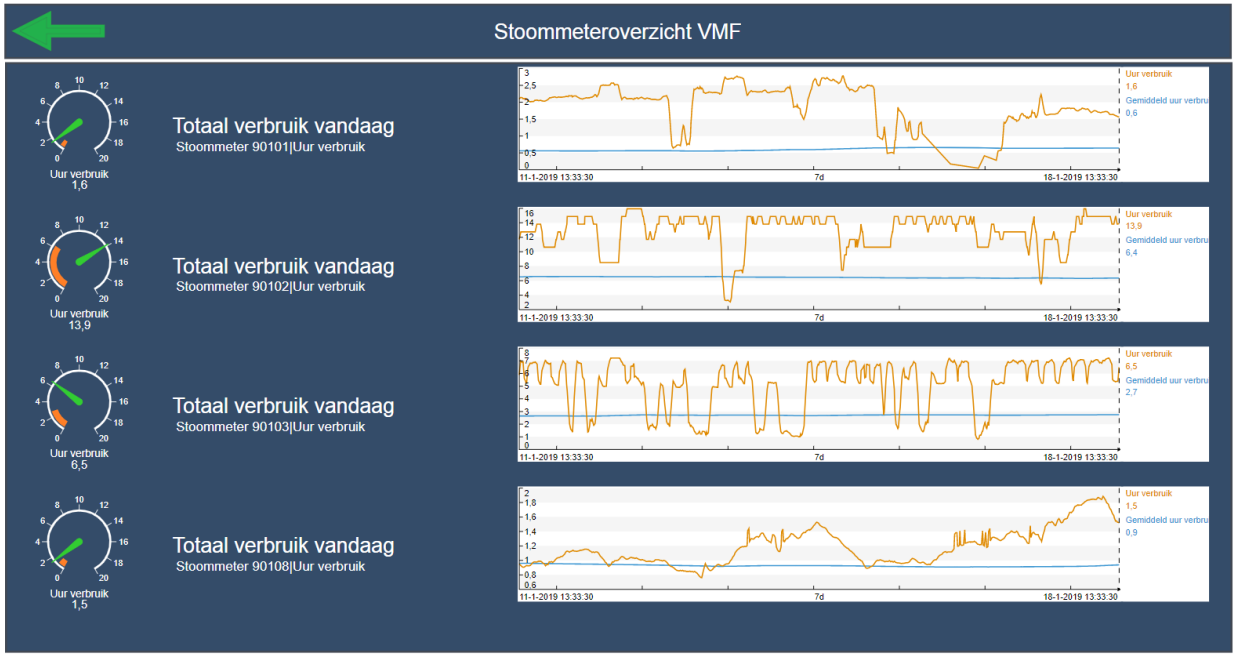
OEE - production line status dashboard



Production status – drum dryers

PI Vision – Energy Monitoring

“Data available anywhere and anytime”



Real-time silo dashboard

TrendMiner in practice: Coagulation

Problem Statement

Reactor shuts down once or twice for every CIP (Cleaning In Place)
→ 30 times per year restart

Approach

Use TrendMiner to look for stable and unstable start-ups
& Compare these periods

TrendMiner in practice: Coagulation

Searching **similar situations** and **compare good** and **bad** events.

Issue:

Valve opened to fast

Solution:

changing ramping in process automation

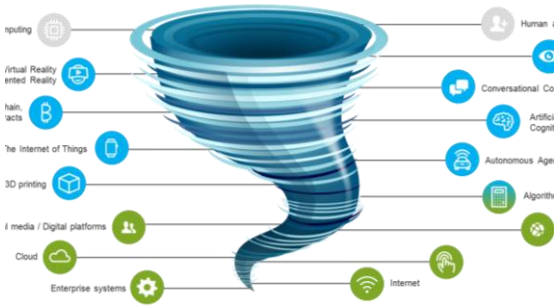
TrendMiner in practice: Coagulation

Business impact

Reduction of 30 downtime periods per year.

Avebe

Transformation to a data-driven organization



CHALLENGE

The technology storm is developing

- More and more technologies coming available on the market
- Additional challenges with an ageing workforce: ~20% will retire within 5 years

SOLUTION

Avebe developed an operations strategy “Avebe Factory4.0”

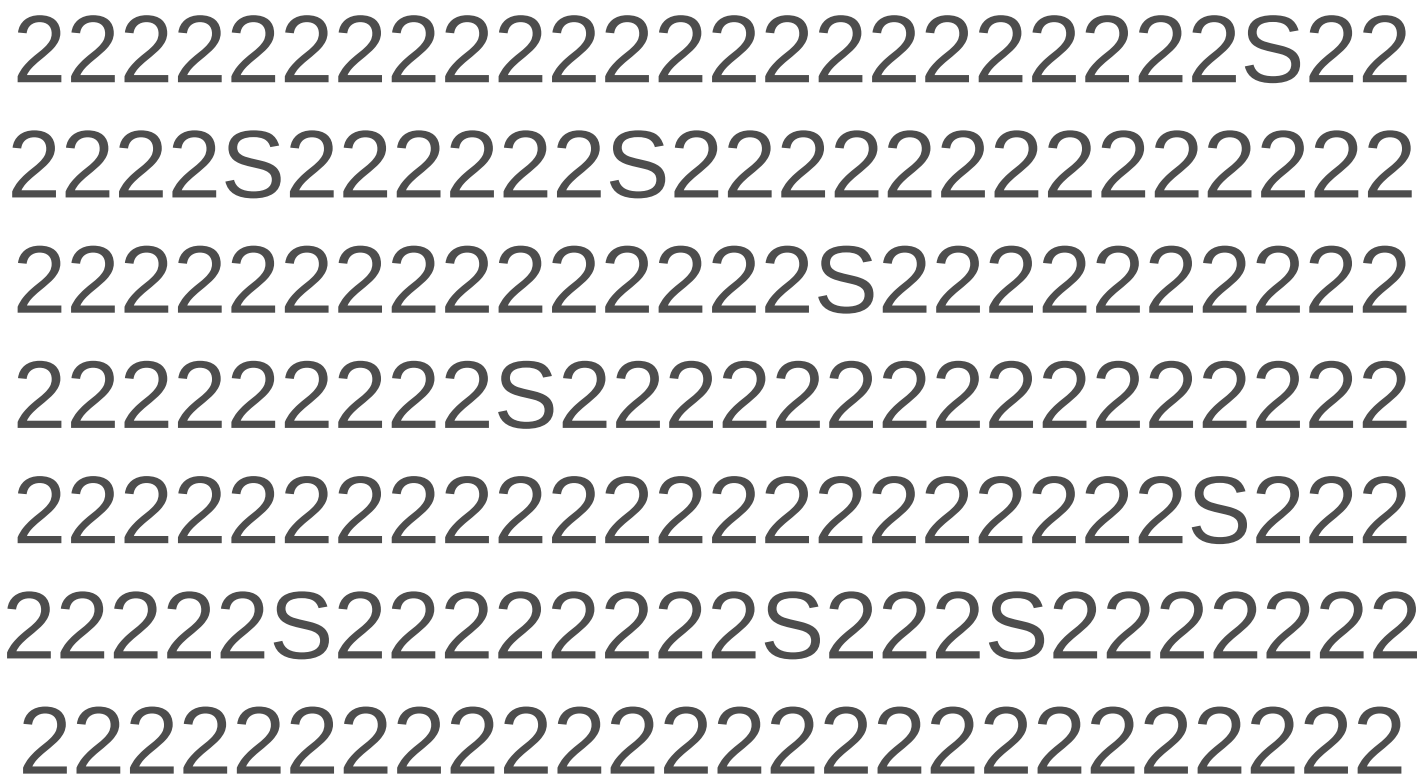
- Main goal Factory4.0: Transforming Avebe with data
- *OSIsoft Enterprise Agreement*

RESULTS

Strategic focus on getting value out of data

- PI System as strategic platform
- TrendMiner Corporate Explorer Program
- WCOM program
- Value Driven Maintenance program

The Power of Visualisation
How many S are in this picture?



The Power of Visualisation
How many S are in this picture?

2222222222222222222222S22

2222S222222S2222222222222

22222222222222S22222222222

22222222S2222222222222222

222222222222222222222S222

22222S22222222S222S2222222

22222222222222222222222222

Number of S

9

* S in title not counted ;)

Questions?

Please wait for the **microphone**

State your **name & company**

Please remember to...

Complete the Survey!

Navigate to this session in the mobile app for survey