From product ideation to optimized production
How Digitalization affects the Brewing Industry

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New business models in the Internet age

- From bookstore to e-book
- From record store to streaming
- From yellow pages to marketplace
- From taxi to ride-sharing
... and the Brewing Industry?

- Cross Brewery / Region Comparison
- Specification & Formulation Management
- Common IT systems reduce total cost of ownership

**Time to Market**

- Greater ability to follow trends
- Craft and Crafty brands
- Premium Brands

**Reduce**

- Reduce manual work and errors
- Enable transformation of data into usable information
- Footprint for Plant functionalities

**Manufacturing Intelligence**

- KPIs and Continuous Improvement
- Drive Cost Reductions
- Enable Mobility for Directors

**Value Chain**

**Shop Floor and Top Floor**
“Digitalization is the next level to yield productivity within Food & Beverage”

Technological driver

- Computing power
- Communication
- New sensors
- Virtualization
- Cloud computing
- Simulation
- …

Digital Enterprise
Integrated Engineering and Integrated Operations

Next level of productivity

Experienced partner for Automation and Electrification
Pioneer for Digitalization in industry

Integrated Drive System (IDS)
Optimum integration of entire drive train, automation and life cycle engineering

TIA@Process Industry
Perfect interaction of all components along the life cycle

TIP@Process Industry
Electrical power wherever and whenever

Time
Looking at Food & Beverage (and Beer Production)…
… Breweries need to improve in terms of speed, flexibility, quality and efficiency

- Speed
- Flexibility
- Quality
- Efficiency
Simply focusing on the automation aspect of production is not enough.
It is necessary to integrate and digitalize the entire value chain

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services
It is necessary to integrate and digitalize the entire value chain

1. Product design
2. Production planning
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5. Services
The holistic approach

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services

Supplier
The holistic approach

Holistic Approach

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services

Supplier
The holistic approach

Holistic Approach

1. Digital Twin of the entire value chain
2. Product design
3. Production planning
4. Production engineering
5. Production execution
6. Services
Digital Enterprise Software Suite – The Siemens answer to Industrie 4.0 requirements

PLM Software Portfolio
• Product Ideation, Exploration and Definition
• Process Development and Evaluation

Integrated Automation Portfolio
• Integrated engineering and runtime for controllers, distributed I/O, HMI, drives, motion control and motors
• Industrial Safety and Security

MOM Software Portfolio
• Manufacturing Execution
• Planning & Scheduling
• Quality Management
• Manufacturing Intelligence
• SCADA / HMI / DCS
The product and production life cycle – digital representation
The “Digital Beer Production” – Holistic Approach from Ideation to the Finished Product

**Ideation**
- Concept Development
- Program and Project Management
- Portfolio Management

**Product Formulation**
- Product and Formulation Design
- Regulatory Compliance
- Supplier Collaboration

**Packaging Design**
- Package Design Development
- Compliance check
- Digital Prototype

**Recipe Creation (General Recipe)**
- Creation of a General Recipe
- Creation of a Bill of Process

**Trials & Validation**
- Trial Production in the Lab
- Simulation of Packaging
- Quality Analysis

**Production Modeling**
- Modeling and Simulation of Assets
- Recipe Transformation
- Check of plant capacity

**Plant Engineering**
- Electrical Design
- Mechanical Design
- Automation

**Virtual Commissioning**
- Creation of Virtual Plant
- Validation of Functionality
- Operator Training

**Production Execution**
- Recipe release and Order planning
- Optimized Production execution
- Data acquisition, Reporting, QC

**Continuous Improvement**
- Analysis of product data
- Analysis of production KPI's
- Improvement process
The “Digital Beer Production” – Holistic Approach from Ideation to the Finished Product

- Optimize your product data and processes to improve collaboration and increase productivity
- A collaborative data platform is an essential tool for reaching this target
- All data and process definitions are available 24/7 – wherever you are
- Data and processes are always up to date – no risk to use deprecated information
An example – creating and introducing a new product

... We need to create a new beverage for the event...

- Which kind of beverage do we need?
- What’s the audience at this event?
- How should the beverage taste?
- What about the brand and the product name?
- What about the cost and the price?
- Which quantity do we expect to sell?
- Where can we produce?
- What about the logistics?
- ...

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services
An example – creating and introducing a new product

- Ok, let’s make a beer
- Let’s look at the “market” and define the target group
- What about the taste?
  - Which raw material do we need?
  - Is there a basic recipe top be re-used?
  - Which quality gates do we apply?
- Label design – how should it look like?
- Which regulatory information needs to go onto the label?
An example – creating and introducing a new product

- Create the recipe – what can be re-used?
- How to transform this into the production systems?
  - Which standards can be applied?
  - How will it appear to the operator?
  - Are there any specific work instructions?
- Do we have enough capacity in the desired plant?
  - Tanks occupation
  - Filling & Packaging
An example – creating and introducing a new product

- How can we efficiently engineer our production assets?
- How can we re-use data coming from the simulation models and ensure the correct capacity and workflows?
- Is there any possibility to enable collaboration of different engineering teams across the globe?
- Can we test and validate the assets before they are shipped?
- What about the operator training? Can it be done based on virtual systems?
An example – creating and introducing a new product

- Ok, we are fine. Let’s start the production of our beer
- How do we realize the connection between business and production, and create a production order?
- Which information needs to be transferred between business and production systems?
- Do we need a possibility for tracking & tracing?
- How do we contextualize our production data and create meaningful reports?
- How can we improve the next production batch?
An example – creating and introducing a new product

- Nice. Our beer is really good. We have additional request for new production runs.
  - What can be improved?
  - How did we do cost-wise? Is there any plant which can produce the same quality at lower costs?
- How can we ensure to always have enough capacity for our beer?
- In case we want to ship the beer to another country: what information needs to be changed on the label?
- In case we want to change the recipe: what is re-usable?
Can all this be done manually?

Most likely not…
Integration in one unique data model shows the advantages of digitalization

Digital twin of the product

Digital twin of the process

Digital twin of the plant
Integration in one unique data model shows the advantages of digitalization
Look carefully at this CEO caught in an Industrial Revolution

No rabbits were harmed in the making of this film…
Thank you for your attention

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