Lonza’s PIVOT
Productivity Improvements via Operations Technology
Isabelle Lacaille
Data Infrastructure Engineer

Lonza
Agenda

Who is Lonza Specialty Ingredients?

The Challenge: Data Visibility

PIVOT: Productivity Improvements via Operations Technology

PIVOT Pilot: RCIP (Red Carpet Incubation Program)

Implementing PIVOT (post-RCIP)

Results and Beyond

Conclusion
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Lonza at a Glance

**31.4**
CORE RONA\(^1\) in %

**5.5 bn**
Sales\(^1\) in CHF

**15,375**
Employees
End of 2018

**1.5 bn**
CORE EBITDA\(^1\) in CHF

**8.0**
ROIC\(^1\) in %

**>30**
Countries
Around the World

**27.3**
CORE EBITDA\(^1\) Margin in %

**1.2 bn**
CORE EBIT\(^1\) in CHF

**~630**
Active Patent Families

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1. Lonza Continuing Operations excluding Water Care business as discontinued operations

CORE definition: See appendix
Lonza at a Glance

Capitalizing on our global footprint (overview of our manufacturing and R&D sites and our sales offices)
## Lonza – The Structure

### Lonza Pharma Biotech & Nutrition (LPBN)
- Drug substance and drug product development and manufacturing for:
  - Chemicals – small molecules
  - Biologics – large molecules
  - Biologics – cell and gene technologies
- Consumables and research tools
- Consumer health and nutritional ingredients and delivery systems

### Lonza Specialty Ingredients (LSI)
- Microbial Control Solutions for:
  - Consumer home & personal care
  - Professional hygiene
  - Paints, coatings, wood and industrial material protection
  - Crop protection
- Enabling Technologies
  - Fine Chemistry
  - White Biotechnology

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Since 1 March 2019, the scope of segments has been aligned. The former Pharma & Biotech segment and the former Consumer Health & Nutrition business unit within the Consumer Health division (formerly part of Lonza Specialty Ingredients) are now combined in the Lonza Pharma Biotech & Nutrition (LPBN) segment. The former Consumer Product Ingredients business unit (formerly part of the Consumer Health division within Lonza Specialty Ingredients) remained part of the Specialty Ingredients segment.
Delivering Innovation in Microbial-Control Applications

Specialty Ingredients’ focus on strengthening its market leadership

Some recent examples

Next Generation Antidandruff Active

Strengthening position as world’s leading antidandruff active supplier

Commenced manufacturing of Piroctone Olamine (PO) to broaden portfolio

Keeping our World Healthy®

New additions to regulated Professional Hygiene offerings

Introduction of hydrogen peroxide-based hard surface disinfectants and FDA-approved non-alcohol hand sanitizers

Regulatory Support

Introduction of microbial-control alternatives, e.g. Triclosan-free antibacterial personal care, Creosate-free protection for timber, regulatory approved fungicides for open system metalworking fluids

Bioactives

Product launches for personal care “aspirational” consumers

Introduction of naturally derived polyglycerol esters for non-ionic emulsifiers and surfactants, and bioactives for scalp and skin

Some recent examples

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Overcoming Data Challenges in a global Organization

1. Accelerate optimization projects

“Collecting, cleansing and analyzing the data for this project will take months…”
Overcoming Data Challenges in a global Organization

1. Accelerate optimization projects
2. Identify & evaluate new opportunities

“I have a gut feeling we could improve productivity here…”
Overcoming Data Challenges in a global Organization

1. Accelerate optimization projects
2. Identify & evaluate new opportunities
3. Empower local sites with tools

“We don’t have visibility into our own process!”
Overcoming Data Challenges in a global Organization

1. Accelerate optimization projects
2. Identify & evaluate new opportunities
3. Empower local sites with tools
4. Increase overall visibility

“We need to know the situation at every site”
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Before PIVOT

Context
Data Collection
Data Cleansing
Analysis

Remote Plant

Process Experts

Execution Support

Travelling

Raw Data collection

Cleansing and Analysis

Expert Knowledge
Process development

Execution/Benefit generation

EXPERT time
PIVOT Concept

Real-Time Data
Historical Data
Dashboards
Reports
Datasets
Analysis Tools

Remote Plant
Data Visualization
Reports

OT

Process Experts
Additional Context
Analysis Results

Context
Data Collection
Data Cleansing

Information
Analysis-ready data

Travelling
Raw Data collection
Cleansing and Analysis
Expert Knowledge
Process development
Execution/Benefit generation

EXPERT time
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What is an RCIP?

Joint offering by Microsoft and OSIsoft to jumpstart a data science initiative

- Validate the technology
- Evaluate the potential of a use case
**Business Objective:**
Shift production away from older, more expensive reactor system by increasing capacity in newer reactor systems

**Data Science Objective:**
Create a model of batch time, understand batch time variance to ultimately reduce average batch time
RCIP Outcomes
Data Contextualization

Asset Hierarchy

Asset Context

Event Context
Challenge: Batch time included idle time

Batch is “Active”, but reaction is complete
RCIP Outcomes
Solving Data Challenges

Challenge: Batch time included idle time
Solution: Use asset analytics to capture sub-batch operations

- Reactor pressure (kPa) X
- Loader
- Idle
- Loading
- Reaction
- Idle

Identify opportunities for increased productivity*

Compare true reaction time between batches

*we'll come back to this later!
RCIP Outcomes

Discovered optimization potential

- Increase in reaction time near the end of 2016
- Root cause: removed trays in distillation column never replaced
- No production disruption, coincided with start-up of second reactor system
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Infrastructure & Tools Needed for PIVOT

- **Local Historian**
- **Control Systems Lab Data**
- **IIoT**

**Global PI System Infrastructure**

- **PI Vision**
- **SEEQ**
- **Power BI**
- **Unscrambler**
Roles & Skills Needed for a successful PIVOT

Knowledge gaps identified during RCIP

OT & Automation
Data Engineering
Data Science

Development Skills
Process Knowledge
Chemistry Knowledge
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Overcoming Data Challenges in a global Organization!

- Accelerating optimization projects
- Identified & evaluating new opportunities
- Empowering local sites with tools
- Increased overall visibility

For more information, attend our second presentation!

Journey Deploying Data Analytics for Manufacturing Insights
Tobias Merz & Brian Crandal (SEEQ)
13:45 - 14:30 Life Sciences Track
Accelerating Process Optimization Projects

Example: Mapleton Batch Time Reduction

Opportunity #1: Optimize temperature increase during reaction

- Data mining revealed golden batches with different temperature profile
- High temperature causes evaporation of reactant, leading to slower reaction
- Potential capacity increase of 15-18%
Accelerating Process Optimization Projects

Example: Mapleton Batch Time Reduction

Opportunity #2: Optimize timing of reactant dosing

- Data mining revealed golden batches with different pressure profile, correlating with reactant
- Precise timing of reactant dosage decreases the occurrence of side-reactions
- Potential capacity increase of 16-20%
Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production

- Long Batch, reaction complete
- Idle Time between batches

No visibility about the reason!

What is the greatest cause of lost pounds?
Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production

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<td>8.56 h</td>
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Identified & Evaluating new opportunities

Example: Reason Codes for pounds lost during production
Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production
Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production

- Largest amount of lost pounds caused by “No Storage | Other”
- No room for production, but exact logistics bottleneck is unknown
- Greatest opportunity is not optimizing reaction time, but rather logistics!
### Conclusion

#### CHALLENGES

- Global Data Visibility...
  - Accelerate optimization projects
  - Identify & evaluate new opportunities
  - Empower local sites with tools
  - Increase overall visibility

#### SOLUTION

- PIVOT Initiative
  - Strategy: Process Improvements via OT
  - Piloted with RCIP
  - Implemented global data infrastructure
  - Created Operations Technology team with required skillset

#### BENEFITS

- Global Data Visibility!
  - Potential capacity increase of 15-20% on two product lines
  - Reason Codes application implemented at 3 sites
  - SEEQ, PI Vision, Power BI used at multiple sites
  - To be continued!
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