The advantages of digitalization for the glass industry

Philippe Mary, Head of Glass Branch, Siemens Belgium

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Digitalization is next level of productivity for the glass industry

Technological driver
- Computing power
- Communication
- New sensors
- Virtualization
- Cloud computing
- Simulation
- ...

Different initiatives, e.g.,
- Industrie 4.0
- Industrial Internet Consortium (IIC)
- Made in China 2025
- ...

Digital Enterprise
From Integrated Engineering to Integrated Operations and Services

Next level of productivity
Industry trends

- **Efficiency**
  - Resource and energy efficiency
  - Demanded product/quantity

- **Flexibility**
  - Customized mass production
  - Volatile markets

- **Quality**
  - Closed-loop quality
  - Traceability

- **Time-to-market**
  - Fast innovation
  - More complex products
  - Lifecycle management

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Security

Health and safety | Environment | Regulations/standards | …
Digital Enterprise is the portfolio of solutions for the digital transformation – for both the discrete and process industries

<table>
<thead>
<tr>
<th>Process industries</th>
<th>Discrete industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product design</td>
<td>Product design</td>
</tr>
<tr>
<td>Process and plant design</td>
<td>Production planning</td>
</tr>
<tr>
<td>Engineering</td>
<td>Production engineering</td>
</tr>
<tr>
<td>Operation</td>
<td>Production execution</td>
</tr>
<tr>
<td>Services</td>
<td>Services</td>
</tr>
</tbody>
</table>

- **Industrial software and automation for process industry**
  - Process and plant design
  - Engineering
  - Operation
  - Services

- **Industrial software and automation for discrete industry**
  - Product design
  - Production planning
  - Production engineering
  - Production execution
  - Services

**Digitalization of the field level**
Mission of the Digital Enterprise for process industries

**Integrated engineering**
- Cloud platform and operating system
- (2D/3D) and commissioning
- Asset performance management
- Data analytics

**Digital twin and simulation**
- Recipe, feedstock quality, …
- Process and plant documentation
- Real plant

**Integrated operations and services**
- Secure connectivity
- Digitally enhanced products
- Maintenance

1. **Product design**
2. **Process and plant design**
3. **Engineering and commissioning**
4. **Operation**
5. **Services**
Integrated engineering for process plants: Common data model ensures consistency of all workflows along the lifecycle

One data hub that completely integrates all disciplines into a globally consistent database …

... and workflows that can be executed in parallel, which saves valuable time and therefore reduces costs.

Yesterday | Today | Tomorrow

Product design | Process and plant design | Engineering and commissioning | Operation | Services
Integrated engineering for process plants: Digital twin and 3D visualization of the plant

During engineering, a digital twin of the plant is created, even before the real plant exists …

… this offers the opportunity for an early 3D visualization of the plant: for example, for training the service staff
Integrated engineering: Data exchange between engineering system and automation

Plant designer

Distributed control system (DCS)

Automated engineering for DCS hard- and software

Your benefits for engineering

• Up to 60 percent time savings in automation engineering thanks to automated engineering of DCS hard- and software
• Consistent data ensure higher engineering quality
• Easy and fast integration of product data with configurators, libraries, and standard interfaces
Integrated engineering and integrated operations for process plants: Simulation improves engineering and operational efficiency

Benefits for engineering and commissioning

- Seamless transfer of engineering data
- Simulation and testing of the automation functions
- Training of operating personnel
- Efficient and smooth system start-up of the real plant
- Avoidance of errors and costly reworking
- Increased safety

1. Product design
2. Process and plant design
3. Engineering and commissioning
4. Operation
5. Services
Integrated engineering and integrated operations for process plants: Simulation improves engineering and operational efficiency

“The Gallo Glass plant is so complex that Simit was essential for us for conducting tests and evaluations. It optimized our engineering and substantially shortened the commissioning time.”

Roger Knüttel,
Manager of the Control Engineering Department at EME Maschinenfabrik Clasen GmbH
Integrated operations for process plants: Data exchange between automation and engineering system

Thanks to the bidirectional data exchange between engineering system and automation, the digital twin is continuously updated and shows the current status of the plant.

Benefits for operations:
- Bidirectional interface
- Always as-is plant documentation
- More efficient maintenance management
- 30 percent time savings
- 20 percent lower cost
- Optimized availability

1. Product design
2. Process and plant design
3. Engineering v commissioning
4. Operation
5. Services
Integrated operations: Optimized workflow for maintenance management

Benefits for maintenance

- Time savings thanks to direct and easy communication between operator and service personnel
- Asset location and necessary documentation available
- All information also available on site
- Direct feedback about maintenance execution
- Plant documentation immediately updated

1. Product design
2. Process and plant design
3. Engineering and commissioning
4. Operation
5. Services
Integrated operations: Operations intelligence enables optimal decision-making in real time

Benefits from operations intelligence
• Access operating data across the entire supply chain
• Compare plant and asset data of your plants worldwide
• Visualize cost factors to identify saving potential
• Monitor Health Safety Environmental information
  ✓ Improved asset transparency
  ✓ Up to 8% reduction in operating costs
  ✓ Up to 10.5% increase in production
Digital services for the glass industry:
Efficient and flexible production, optimized complex value chains

1. Product design
2. Process and plant design
3. Engineering and commissioning
4. Operation
5. Services

Digital Services

- SIMATIC Virtualization as a Service
- Managed Support Services
- Technical Support
- SIMATIC Remote Services
- SIMATIC System Audit
- Asset Optimization Services
- Calibration and Verification
- Lifecycle Information Services
- Preventive Maintenance
- Spare Parts Stock

SIEMENS
Ingenuity for life
Cloud-based, open Industrial IoT operating system offers a solid foundation for new, data-based business models

For example, smart motors

Developed by Siemens, equipment suppliers, plant operators, and industrial app developers

MindApps
• Asset transparency and analytical insights: for example, predictive maintenance
• Fleet management

MindSphere
• Open interface for developing customer-specific apps (MindApps)
• Various cloud infrastructures: public, private, or on site

MindConnect
• Open standards (like OPC UA) for connectivity (also to third-party products)
• Plug-and-play connection
• Example: smart motors
Example of MindConnect
Smart motor: digitally enhanced electrification and automation

Smart motors – connected to MindSphere

- Integrated vibration, magnetic flux, and temperature sensors
- Reduce downtime to increase fleet and plant availability and reliability
- Optimize operation efficiency
- Maintenance and servicing activities for early planning and optimization
The security concept

The security concept – Defense in Depth

Products and systems with integrated security

Knowledge and copy protection
Authentication and user management
Firewall and VPN (virtual private network)
System “hardening”

Plant security services

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Page 17
Philippe Mary/ Head of Glass Branch, Siemens Belgium
Summary

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Quality
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Security

1 Product design
2 Process and plant design
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4 Operation
5 Services
Thank you for your attention

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