Digital Assessment: the starting point of a Digital Enterprise Transformation
Our customers have to overcome challenges in all industry sectors

Speed  Flexibility  Quality  Efficiency

Security
We want to guide you on your digitalization journey
Digitalization as a tool to make you more competitive

Identify **improvement** areas and gaps

Sharing digital **possibilities**

Building a **roadmap** together for digitalization
Future Challenges that you may will face
Real use cases, real data, real impact for electronics manufacturing

Improving Efficiency
- 200 ppm to 70 ppm during last 6 years (2.8x)
  - Reduction of energy carriers consumption in first year of implementation (45%)
  - Variance (1%)

Increase Quality
- NCC (40%)
  - Delivery reliability (5%)
  - Field return rate (79%)

Reducing Time to Market
- NC programming time (5-10x)
  - MTBF (82%)

Support Flexibility
- Volume increased (82%)
  - Shop floor process quality from 85 dpm to 11 dpm (4x)

Over 10 years digitalization journey
Final project deliverable is a prioritized digitalization roadmap

<table>
<thead>
<tr>
<th>Example of a project goals</th>
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<tr>
<td>Increase productivity, efficiency and quality</td>
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<tr>
<td>Reduce cost</td>
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<tr>
<td>Maximize efficiency of capital allocation</td>
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<td>Establish a highly integrated value chain</td>
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The portfolio for the Digital Enterprise with efficient interoperability of all automation components

Product Lifecycle Management and Enterprise Resource Planning
- Product design
- Product data management
- Production planning
- ERP

Management
- Manufacturing Execution System

Operations
- SCADA System
- Totally Integrated Automation Portal
- Energy Management

Control
- Controller
- HMI
- IPC
- Communication
- Motion Control
- CNC

Field
- Power Supply
- Industrial Identification
- Distributed I/O
- Drive Systems
- Industrial Controls

Integrated Engineering
- Product design
- Product data management
- Production planning

Industrial Data Management
- Engineering Framework

Industrial Communication
- SCADA System
- Manufacturing Execution System

Industrial Security
- Totally Integrated Automation Portal
- Energy Management

Safety Integrated
- Controller
- HMI
- IPC
- Communication
- Motion Control
- CNC

Integrated Engineering Framework
- Product design
- Product data management
- Production planning

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Page 6
In order to remain competitive in the future, the value chain must be integrated and digitalized.
Creating a Digital Twin of the entire value chain

Driving the Digital Enterprise for discrete industries

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

Collaboration platform: Teamcenter

Suppliers and logistics

Cloud-based, open IoT operating system: MindSphere

Third party applications
A team of experts will guide you to capture value out of digitalization

<table>
<thead>
<tr>
<th>Understanding</th>
<th>Maturity Assessment</th>
<th>Technical and financial feasibility</th>
<th>Digital Enterprise Implementation Roadmap</th>
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<tr>
<td>• Define the scope of work based on the company strategy, capabilities, and technologies</td>
<td>• Prioritize the opportunities</td>
<td>• Gap analysis</td>
<td>• Management decision for the roadmap</td>
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<tr>
<td>• Identify Key Success Factors/business drivers</td>
<td>• Conduct interviews to understand the challenges and processes</td>
<td>• Refine the &quot;To Be&quot; processes</td>
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<tr>
<td>• Align deliverables and expectations</td>
<td>• Detailed analysis of the &quot;As-Is&quot; value chain</td>
<td>• Align the action plan to the &quot;To Be&quot; target customers</td>
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<td>• Define the &quot;To Be&quot;</td>
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<td>• Identify potential initiatives</td>
<td>• Investment prioritization (NPV, ROI)</td>
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Digitalization from the field to the PLM and ERP
AS-is data flow framework- for an existing product
## CUSTOMER Digital Maturity: Assessment
### Summary and example

### Current Situation Impacts

- Manual data collection
- Error on production counting and weighting
- High planning efforts
- Days required to replan in case of unplanned event
- Overall OEE: 60%-70%
  - € 350k/year - Compressor is working with leakage
- € 400k/year – Deviation on inventory
- € 1.8Mi/year – Wrong allocation of stock
- -20% Line Inspector Wasted Time w/ Filling Paper
- Duplicate inputs and inconsistency between systems
- € 1.2Mi/year losses on scraps
- Risk of taking wrong decision due to lack of real-time information
  - Days are required to answer Customer Claims due to limited traceability (20 Claims/month)

### Proposed Solution Benefits

- Reliable data from online and integrated data collection
- Online machine monitoring
- Automatic production counting and scrap monitoring accuracy
- Reduced efforts by seamless planning
- Multi-scenarios simulation
- Increase of efficiency by plant simulation
- OEE improved by online machine condition monitoring, reducing ramp up time and increasing flexibility on assembly lines
- Reduce energy consumption by energy management program
- Accurate inventory using barcodes and automatic labeling and reading machines
- Reduce WIP by optimizing material & assembly flow
- Reduce efforts and increase quality data reliability by online and centralized data collection
- Reduce scrap losses using quality management systems to identify root causes
- High transparency and support for decisions using online monitoring dashboards & KPIs
- Increase customer relationship by a transparency track & trace system for the complete production flow

### Exhibit 5: Digitalization maturity chart for production execution

- **€ 400k/year**
  - Deviation on inventory
- **€ 1.3Mi/year**
  - Wrong allocation of stock
50+ potential solutions to help CUSTOMER to improve productivity

- **25+ Pain Points Identified**
- **50+ Ideas/Solution Identified**

### Ideas/solutions

<table>
<thead>
<tr>
<th>Main Pain Points</th>
<th>ShopFloor Automation Network</th>
<th>Integrated Central Database 1)</th>
<th>Shopfloor Monitoring (Machine and Lines) and Management Dashboard</th>
<th>Digital Process Traceability 2)</th>
<th>Energy Management</th>
<th>Material Flow Optimization</th>
<th>Seamless Planning</th>
<th>People Development (i.e., SAP, WinCC)</th>
<th>Workplace Optimization (i.e., Robots, Automated Handling System, paperless production)</th>
<th>Condition monitoring</th>
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1) Production Counting, Quality, Alerts, Reliability, Energy Consumption, Maintenance  
2) Wireless scanners, automatic labeling, Smart Glove, Automatic Reader Machine, GPS localization, weighting

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**Customer Claims**
- Connectivity of machine

**Connectivity of machine**
- Internet of Things
- Cloud Services

**People Development**
- Training programs
- Mentorship programs
- Leadership development

**Workplace Optimization**
- Robotics automation
- 3D printing
- Virtual reality

**Condition monitoring**
- Predictive maintenance
- Condition-based maintenance

---

**Need of Standardization**
- Reduce variability
- Improve consistency

**Need of Transparency**
- Real-time visibility
- End-to-end traceability

**Need of Traceability**
- Customer claims
- Machine connectivity

**Need of Digi Culture**
- Digital transformation
- Data-driven decision making

**Need of Efficiency**
- Stock reduction
- Work-in-progress optimization
- Energy management
## Proposal Outcomes – Digitalization projects

### Project Overview

**Project Name**

#### MES

- **Product Life**
  - En
  - Pr

<table>
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<th>Classification</th>
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<tbody>
<tr>
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#### PLM Backbone

**Product Life Cycle Phase**

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<tr>
<th>Enterprise Integration</th>
<th>Production Planning</th>
<th>Production Execution</th>
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<th>Service for Production</th>
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#### Predictive Maintenance System

**Product Life Cycle Phase**

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<tr>
<th>Medium Investment</th>
<th>High Complexity</th>
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<th>Medium Schedule duration</th>
<th>High Impact on Business</th>
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#### Classification

- **GIlico has th on the mach list, include When a pr origin of the results in su**
- **Glic has on the ma list, inclu When a or pr of th resu in t**
- **All data spreadhs downtime for Curren, G**
- **Current KPI**

#### Digitalization Trend

- **Technology**
- **Manufacturing**
- **People and Organization**

#### Current Situation

GIlico has the concept of "My machine" which means that one team is responsible for the machine and this team has expertise on the machine (e.g., how to operate, maintenance, etc.). For each line there are operators who perform the maintenance check list, including preventive and minor corrective tasks. For the package lines the maintenance done by operator is very limited. When a problem occurs in the secondary process such as an abnormality within the sensors, sometimes it is hard to find out the origin of the problem. Also, when it is necessary change the PLC program code, not everyone has the knowledge for that which results in support from the supplier which, from the Manufacturing perspective, increases the downtime.

All downtime incidents are registered on a spreadsheet so they can calculate the overall downtime of the factory. A separate spreadsheet is used for the details of the incident and downtime (location, description). Each process has a different target for downtime for every fiscal year.

Currently, Glico is not executing a structured predictive maintenance.

Current KPI in Chiba factory: Downtime Ratio (target 0.75%, current value 1.56%, accumulated 0.8%).

### Pain Point and GAP’s

- No predictive maintenance implemented
- It is difficult to keep track of downtime and OEE of each machine. It is also difficult to search for similar issues on the past and there is no traceability over loss opportunity and money over downtime.
- Downtime ratio above target in Chiba factory.

#### Project Scope

Predictive Maintenance with Condition Monitoring allows the customer to predict failures before they occur. By monitoring in real time critical equipment areas it is possible to identify deviations in machine functions that could result in machine stops or breakdowns.

The project consists in:

- Define a strategy for a predictive maintenance program at Glico (e.g.: OEM specialized solutions for the line, tailor-made solution, etc.)
- Define which machines are critical for the factories production and prioritize the ones that should be considered first over the other machinery.
- Identify which data should be monitored for each machine prioritized and evaluate whether it is already being monitored.
- Define the system for predictive maintenance and the architecture to support the system (e.g.: cloud based).
- If high quality is available, data science methods can be used to find correlations.

#### Expected Benefits / Return

- Reduced unplanned downtime (increase availability)
- Reduced the number of packs that went to waste every day
- Efficiently manage the failures and optimize the lines usage based on machine/paras’ predicted time to breakdown
- Savings for maintenance spare parts

#### How Siemens can support

- **Consulting**
- **Product Portfolio**
- **Implementation**

- **CMS / X-tools**

#### Schedule Plan

<table>
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<tr>
<th>Duration</th>
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**SIEMENS**

**Ingenuity for life**
Roadmap: Most of the actions with the best return of investment need 3 months of implementation

Exhibit 1: Digitalization projects roadmap

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<tr>
<th>ID</th>
<th>Task Name</th>
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Driving the Digital Enterprise - Make the future yours!

Konstantin Zois
Γενικός Διευθυντής,
Digital Industries
Αγησιλάου 6-8
151 23 Μαρούσι
Τηλ: +30 (210) 6864 564
E-mail: konstantin.zois@siemens.com

www.siemens.gr/industry