Journey Towards Digitalization
Industrie 4.0 Seminar for SMEs
15 June 2017
Digitalization Across Siemens Malaysia (By Divisions)

Digital Factory, Process Industries & Drives (DF PD)
- Digitalization in DF PD = TIA portal to reduce engineering cost, Digital Twin simulation, PLM software & automation that reduce time-to-market.
- Reference project = SIMATIC S7 & control product for Chemicals Solutions for Faeth ASIA

Power and Gas (PG)
- Digitalization in PG = Addictive manufacturing, rapid prototyping, integrated design system for gas turbines, 3D simulation & monitoring
- Reference project: Most commercially powerful SGT5-8000 H-class gas turbines for Pengerang CC Power Plant

Energy Management (EM)
- Digitalization in EM = Agility and flexibility through intelligent technologies like smart grid network and decentralization that herald the future of energy systems / unleash power of utilities
- Reference project = eMeter MDMS Phase 1 for TNB AMI Rollout

Power Generation Services (PS)
- Digitalization in PS = Predictive and preventive maintenance with access to real-time data, increased operational flexibility, remote ability to supporting outages, improved productivity in turbines
- Reference project = TNB Prai CC Power Plant (2 most powerful gas turbines in SEA region, the H-class)

Mobility (MO)
- Digitalization in MO = Time-optimized service through technical intelligence and smart traffic control systems, efficient infrastructure and fleet management.
- Reference project = Centralized traffic control for ERL

Building Technologies (BT)
- Digitalization in BT = Use of intelligent technology and individualized services to create the experience of a smart building.
- Goals: Sustainability, efficiency and reduced cost
- Reference project = KLCC Fire Migration System
Digitalization changes everything.
New business models in the internet age are disrupting complete markets

From retail store to e-commerce

From Yellow Pages to marketplace

From record store to digital stream

From taxi to ride sharing
Digitalization Changes Everything, Everywhere
The pace of technological advances is fueling digital transformation

The cost of key technologies is falling

<table>
<thead>
<tr>
<th>Technology</th>
<th>Year 1</th>
<th>Cost 1</th>
<th>Year 2</th>
<th>Cost 2</th>
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</thead>
<tbody>
<tr>
<td>DRONES</td>
<td>2007</td>
<td>$100,000</td>
<td>2013</td>
<td>$700</td>
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<td>3D PRINTING</td>
<td>2007</td>
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<td>2014</td>
<td>$100</td>
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<td>INDUSTRIAL ROBOTS</td>
<td>2007</td>
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<td>2014</td>
<td>$20,000</td>
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<td>SENSORS</td>
<td>2007</td>
<td>$30,000</td>
<td>2014</td>
<td>$80</td>
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<td>SMART PHONES</td>
<td>2007</td>
<td>$449</td>
<td>2015</td>
<td>$10</td>
</tr>
</tbody>
</table>

Source: Accenture Technology Vision 2015

Implications of Moore’s Law

Transistor density

Cost of technology

Source: Leading Technology Research Vendor
In order to remain competitive manufacturing companies need to achieve enormous improvements in their processes.

- **Reducing the time to market**
  - Shorter innovation cycles
  - More complex products
  - Larger data volumes
  - Product and production integrated

- **Enhancing flexibility**
  - Individualized mass production
  - Volatile markets
  - High productivity
  - Flexible production

- **Increasing Quality**
  - Closed loop quality processes
  - Traceability and integrated genealogy
  - Full process transparency

- **Increasing efficiency**
  - Energy efficiency and resource efficiency as key competitive factors
  - Optimized production resources
Digital Enterprise is our portfolio of solutions for the digital transformation.
The automation portfolio for the Digital Enterprise with efficient interoperability of all automation components

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Integrating and digitalizing the entire value chain is key to staying competitive in the future.
Overview of Siemens Digitalization

Digitalization In Discrete Manufacturing

Digitalization in Process Industries

Services
Holistic approach
Specific for end customers
NX - Integrated CAD/CAE/CAM

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services
Realizing innovation with 3D simulation
Human simulation to simulate, analyze, and optimize assembly processes and ergonomics
Simulate, visualize, analyze, and optimize production systems and logistics processes
Mechatronics Engineering and Virtual Commissioning

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

Automated Engineering:
PLC code generation for TIA Portal

Digital Twin of SIMATIC S7-1500
Digital twin of the machine for simulation, testing and virtual commissioning
Integration of PLM and TIA: Merging mechanical and automation engineering

Software in-the-loop

Mechanical model

NX
Mechatronics
Concept
Designer

Automation

PLCSIM
Advanced

Totally
Integrated
Automation
Portal
Automatic generation of PLC code and HMI screens

User scenario

With TIA Portal Openness

- Easily generate automation programs for serial machine builder by using information from upstream processes
- Exchange data with upstream engineering processes in TIA Portal

- More **efficiency** by a faster execution of the task
- **Less errors** by automation of constant processes
Easy acquiring and visualizing energy consumption data

TIA Portal with SIMATIC Energy Suite

- Intelligent linking of energy and production data
- Automatic generation of energy management program
- Seamless connection to the energy management system
With Siemens’ integrated technologies, Maserati was able to reduce development time considerably while increasing production output.

- **Reducing the time to market**: 30% shorter development time
  - Close integration of suppliers

- **Enhancing flexibility**: Ghibli available in 70,000 combinations

- **Increasing efficiency**: 3 times more cars produced than before
  - Integration of two new assembly lines into existing factory

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1. **Product design**
   - NX CAD
   - NX CAE
   - LMS
   - CD-adapco Star-CCM+
   - Teamcenter

2. **Production planning**
   - Tecnomatix Teamcenter

3. **Production engineering**
   - SIMATIC

4. **Production execution**
   - SIMATIC
   - SIMATIC IT
   - SINUMERIK
   - SCALANCE
   - SITOP
   - SIRIUS

5. **Services**
   - Uptime and sparepart services
Siemens Amberg plant

Fast!

~1 Million monthly production of SIMATIC products

Flexible!

1200+ Teamcenter managed products shipped to
60,000+ customers worldwide each year
24 hour lead time for new orders

Efficient

75% OEE plus 20% buffer for overcapacity

Quality!

~11 dpm means near perfect quality – every time
Overview of Siemens Digitalization
Digitalization in Discrete Manufacturing
Digitalization in Process Industries
Services
From Integrated Engineering to Integrated Operations

- Lifecycle plant management with a holistic tool landscape
- Common data model for a shorter time-to-market
- Increased efficiency through simulation
- Optimized operations based on high plant and process transparency with a digital twin
Integrated Engineering for process plants: Common data model ensures consistency for all workflows along the lifecycle

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

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

Yesterday  
Today  
Tomorrow

1 Product design  2 Process & plant design  3 Engineering & commissioning  4 Operation  5 Service
Integrated Operations: Optimized workflow for maintenance management

Your benefits in Maintenance

- Time saving by direct and easy communication between operator and service personnel
- Asset location and necessary documentation available via COMOS and COMOS Walkinside
- All information also available on site
- Direct feedback about maintenance execution
- Plant documentation immediately updated

1. Product design
2. Process & plant design
3. Engineering & commissioning
4. Operation
5. Service
Management Dashboard – XHQ runs on iOS, Android
Simultaneous engineering of two plants for superabsorbent polymers in China and Brazil (cloning)

- Immediate learning effects support optimization of the system design and engineering processes
- The synergy effects exceeded all expectations
- Additional benefits that extend beyond the engineering and design phase
Overview of Siemens Digitalization

Digitalization in Discrete Manufacturing

Digitalization In Process Industries

Services
MindSphere –
The cloud-based, open Internet of Things operating system

MindApps
by
Siemens
OEMs
End customers
App developers

Optimized performance of assets, energy and resource consumption, maintenance, services …

MindApps
• Asset transparency and analytical insights, e.g. predictive maintenance
• Subscription based pricing model
• Fleet management

MindSphere
• Open interface for development of customer specific apps (MindApps)
• Various cloud infrastructures:
  Public, private or on-premise

MindConnect
• Open standards (e.g. OPC UA) for connectivity (also to 3rd party products)
• Plug and play connection of Siemens products
Summary: Steps for Implementing successful Digitalization

1. Identify pain-point
2. Convince your stakeholder
3. Evaluate which comes first
4. ROI evaluation
5. Plan road map
Focus on

- Speed
- Flexibility
- Quality
- Efficiency

Security
Thanks You

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Enjoy the movie

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