

## Hannover Messe Trade Fair 2015

### “On the way to Industrie 4.0 – The Digital Enterprise”

#### – Summary –

#### Influence of digitalization

- Industry faces new defining trends and challenges, both now and in the future.
- Siemens has been an innovation leader in electrification and automation for decades.
- However, taking an insular view is no longer sufficient for increasing efficiency gains in these areas.  
→ The key lies in the networking of sensors, measuring devices and scanners, industrial machines and automated systems. Digitalization is the key technological driver for this.
- Digitalization acts as an accelerator for business processes and is revolutionizing global business.
- Companies can work together more closely and faster with partners, communicate directly with end customers and deal effectively with their specific changing requirements.

#### New business models

- Totally new business possibilities and models are being created; examples include:
  - From book store to the eBook
  - From record store/videotheque to streaming
  - From Yellow Pages to online marketplace
  - From taxi to ride-sharing
- Strong new companies – whose know-how is based on mastery of data – are crowding into international markets.
- The steady growth of data volume is challenge and opportunity alike.  
→ Smart evaluation and analysis of data supports industrial decision-making processes and plays a crucial role in boosting productivity.

## Smart Data to Business

- Siemens has the capability to transform data (big data) into knowledge (smart data) and into business (business models) – thereby generating crucial value added for its customers.
- The basis of this “smart data to business” principle is the combination of the outstanding domain, product and process know-how available at Siemens with the in-depth software, IT and analytical knowledge bundled within the company.

## The main challenges in the industrial environment

- Production and service industries face enormous challenges resulting from the advance of digitalization.
- The main challenges in the industrial environment are:
  - Shorter the time-to-market
  - Increased flexibility (mass customization)
  - Boosted efficiency

## Industrie 4.0

Solutions for the challenges in discrete industry are being sought in initiatives such as “Internet of Things” or “Industrie 4.0”; key research areas of I4.0 are:

- Horizontal integration of the entire value added process through corresponding IT support
- Seamless integration of all engineering tools across the entire value chain
- Creation of integrated, networked production systems

## Digital Enterprise – the Siemens solution portfolio for the implementation of Industrie 4.0

- Industrie 4.0 concerns all aspects of the industrial value chain.
  - Siemens concentrates on selected domains including, for example:
    - Industrial control systems,
    - Lifecycle data management,
    - Industrial communication & security
- Siemens aspires to play a defining role in pushing forward the transformation to Digital Enterprise in industry based on four cornerstones:
  - Transparency as well as internal and external networking,
  - Integration of the value chain with seamless engineering,
  - The use of intelligent models, and

- Modular, networked and secure automation.
- In all our fields of activity we have bundled products and services that specifically use the possibilities of digitalization – which takes various forms in different industries – and thus help increase value for our customers and for ourselves.
- In discrete industry, all steps in the production value chain are being digitalized and integrated – from product design, production planning and engineering to the actual production and services as well as throughout the entire supplier network.
- “Digital Enterprise” is the Siemens solution portfolio for the implementation of Industrie 4.0; it comprises four core elements:
  1. *Digital Enterprise Software Suite*
  2. *Industrial communication networks*
  3. *Security in automation*
  4. *Industrial service backbone*

→ The “Digital Enterprise” – in the sense of the digital company – long since has been more than just a vision for us; today we already sell important components of the digital enterprise to our customers.

### **Digital Enterprise Software Suite**

- The software solutions offered by Siemens cover all requirements of industry – from design to services.
  - for design and virtual production: Teamcenter, Tecnomatix, NX
  - for physical production: SIMATIC IT, SIMATIC S7

### **Communications solutions for industry**

- We offer solutions for low-effort, secure, end-to-end communication in industry:
  - PROFINET
  - Components for wireless industrial communication
  - Ethernet switches
  - Rugged Com products
  - SIMATIC NET
  - SINEMA servers
  - Fast Connect
  - AS interface
  - Industrial remote control, etc.

## Products and solutions for security in industry

- As part of our *Defense in Depth* concept we offer a wide portfolio of products and services for comprehensive security in industry. The concept comprises:
  - System security
  - Network security
  - System integrity

## Services for industry

- We also offer a wide portfolio of digital, data-based services to meet all requirements in the industrial environment. These plant data services include:
- Siemens Plant Analytics Services
  - Plant and asset optimization through:
    - Asset analytics,
    - Energy analytics,
    - Process data analytics;
- Siemens Plant Security Services
  - Holistic security portfolio for industrial sites;
  - securing data confidentiality and integrity as well as plant and asset availability
    - Plant assessment
    - Plant optimization
    - Managed security service;
- Siemens Plant Cloud Services:
  - Open industrial cloud platform, including standardized device connectivity
  - Eco-systems for customers and analytics partners,
  - Siemens as “data administrator”.

## Building of an open cloud platform for industrial customers – Cooperation with SAP

- The basis for our data-based plant cloud services is the building of an open cloud platform for applications in industry. The platform offered by Siemens uses HANA technology provided by German software specialist SAP HANA.
- The SAP HANA cloud platform is based on SAP in-memory technology and is an open platform for customers and developers for developing, upgrading and operating apps in the cloud.
  - Advantages and characteristics of this solution
    - Optimization of plants and machines as well as energy and resources
      - Open standard (OPC) for connecting Siemens and third party products
      - Plug-and-play integration of Siemens products (engineering with TIA portal)
      - Cloud for industry featuring an open application interface for individual customer applications

- Cloud infrastructure can be selected by the customer – whether he wants to use a public cloud, private cloud or an on-premise solution
- Transparent pay-per-use pricing model
- New business models possible (e.g. offering machine operating hours)

## Digital Enterprise in the process industry

- The trend towards Industrie 4.0 is a main issue for discrete industry, but it is also under discussion in the process industry.
  - Siemens is actively promoting digitalization in the process industry on the basis of its existing product offering for electrification and automation.
  - The company offers a wide portfolio of industry-specific solutions for oil & gas, chemicals, pharmaceuticals, food and beverages, mining, cement, metal.
- Even if a large proportion of process industries also have discrete parts in their production processes – for example packaging in the pharmaceutical industry – the requirements in many fields of the process industry nevertheless differ significantly from those of the discrete or hybrid industries previously mentioned. The central drivers are:
  - Volatile and heterogeneous global markets
  - High cost pressure depending on location, price of input materials, production efficiency, risk of down times, the demand situation,
  - Energy and resource efficiency – the sustainability aspect, reduction of CO<sub>2</sub> emissions or the general legal framework also play a role here,
  - Demographic change reflected not least in a shortage of skilled workers in engineering and plant operation.

[→ The drivers market volatility, energy and resource efficiency and shortage of skilled workers *also* apply to manufacturing industry.]
- How great the influence of these factors is depends on the particular industry and the nature of the processing plant concerned.
- Based on the crucial drivers in the process industry, Siemens is focusing on three core fields of action for defining and implementing the vision of Industrie 4.0 in the process industry:
  1. *Digital plant design and processes*
  2. *Modularization*
  3. *Production excellence*

## Conclusion

- The Digital Enterprise is our innovative portfolio of solutions for the implementation of Industrie 4.0 in enterprises of all sizes.
- Digital Enterprise portfolio elements are already available today.
- Digital Enterprise comprises four core elements:
  1. *Digital Enterprise Software Suite*
  2. *Industrial communication networks*
  3. *Security in automation*
  4. *Business-specific industrial services*
- Already today, customers can invest in future-proof solutions for Industrie 4.0 with Siemens' Digital Enterprise.

→ Our showcases in the Siemens booth at the Hannover Messe show what solutions for Digital Enterprise we are already able to offer our customers today (Showcases/Highlights).

### Showcases:

- **Process Industry:** The focus here is on efficient, comprehensive plant management for higher availability, resource efficiency and productivity.
- **Machine Building:** We demonstrate easy simulation and implementation across the entire lifecycle for more flexible production processes.
- **Additive Manufacturing:** Throughout the entire product lifecycle – from lab production to serial production
- **Automotive Manufacturing:** See how our NX software is used to produce a digital twin of the Maserati Ghibli.