Innovation at speed and scale

Roland Busch, CTO and Member of the Managing Board of Siemens AG
### Siemens Innovation Day 2016

- Increase R&D investment to over €5 bn
- Create new digital offerings, roll-out of MindSphere
- Achieve double-digit annual growth in digital businesses

### Siemens Innovation Day 2017

- €5.2 bn R&D investment in Electrification, Automation, and Digitalization
- More than 250 digital offerings (digital services and industrial applications), 1 million connected assets (+25%)
- 20% revenue growth from software and digital services
Spending for research and development in billions of euros

- FY 2014: €4.0 billion
- FY 2017: €5.2 billion, ~+40% increase
- FY 2018e: ~€5.6 billion

- €1.2 billion R&D in digital business in FY 2017
- 20% R&D intensity for digital business
- Currently 24,500 software engineers
Siemens Healthineers visualization experts nominated for the 2017 German Future Prize
3D printing of gas turbine blades
Atellica: ultrafast and flexible diagnostics platform
Mireo: innovative platform for premium-class mass transit
1,100 kV: record-breaking HVDC
NX for additive manufacturing
**Innovation with a clear focus – Siemens Company Core Technologies**

<table>
<thead>
<tr>
<th>Additive Manufacturing</th>
<th>Autonomous Robotics</th>
<th>Blockchain Applications</th>
<th>Connected (e)Mobility</th>
<th>Connectivity and Edge Devices</th>
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<tr>
<td>Cybersecurity</td>
<td>Data Analytics, Artificial Intelligence</td>
<td>Distributed Energy Systems</td>
<td>Energy Storage</td>
<td>Future of Automation</td>
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<td>Materials</td>
<td>Power Electronics</td>
<td>Simulation and Digital Twin</td>
<td>Software Systems and Processes</td>
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Improving innovation speed and capital allocation with Siemens Company Core Technologies

Full innovation cycle: university collaboration – applied research – advanced applications and prototyping

Covering technological as well as *business model innovations*

Output-driven and market-oriented

Tapping *outside innovations* with partners/ecosystem and *next47*

~€500 million *focused investments*
Our innovation and digitalization agenda

Speed and scale
Digitalization is a key driver of innovation and growth

<table>
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<th></th>
<th>Revenue FY 2017</th>
<th>Market growth CAGR FY 18 – 22</th>
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<tr>
<td><strong>Digitalization</strong></td>
<td></td>
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<tr>
<td>Siemens software</td>
<td>~€4.0 bn</td>
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<tr>
<td>Digital services</td>
<td>~€1.2 bn</td>
<td>~+8%</td>
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<td>MindSphere</td>
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<td><strong>Automation</strong></td>
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<tr>
<td>Enhanced automation</td>
<td>~€19 bn</td>
<td>~+3%</td>
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<td>Classic services</td>
<td>~€17 bn</td>
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<tr>
<td><strong>Electrification</strong></td>
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<tr>
<td>Enhanced electrification</td>
<td>~€43 bn</td>
<td>+1-3%</td>
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Revenue digital businesses: €5.2 bn

1) Total growth: +20% (+20% in software, +20% in digital services)
Growth excluding Mentor Graphics acquisition: +11% (+9% in software, +20% in digital services)
Our offering differentiates us clearly from our competitors

- Deep domain know-how in a broad range of markets and industries
- Strong installed base/connected fleet
- Powerful ecosystem
- Unmatched digital portfolio: MindSphere, Software, Services, Security
- Numerous Siemens internal use cases as proof points
Siemens has continuously and strategically invested in its software portfolio and partnerships.

1) Minority equity investment
Closed loop innovation – the digital twin improves development, production and operation

MindSphere connects the virtual with the real world – from factories to infrastructure
MindSphere, open cloud-based IoT operating system

- Connectivity
- Strong partner ecosystem
- Closed-loop innovation
- Advanced analytics and machine learning
- Powerful industrial applications and digital services

Scaling up with AWS
Developments of our digital offerings over the last 12 months

+25% connected assets: 1 million devices and systems

doubled number of customers: plus 2,900

4x increase of digital offerings: more than 250
The digitalization of industries requires a different approach

How to turn data into value?
How to create digital offerings?
MindSphere Application Centers for Siemens digital offerings

- Domain know-how/vertical expertise
- MindSphere and software portfolio
- Data analytics capabilities
- IoT integration competence

Co-location

Customer

Co-creation

Digital offerings
Industrial apps
Digitally enhanced services
Integrated digital solutions
MindSphere Application Centers for Siemens digital offerings

20 MindSphere Application Centers

50 Locations in 17 countries across the globe

~900 software developers, data specialists and engineers

Speed and scale
MindSphere Application Centers – Locations around the globe

- Dubai
- Singapore
- Hong Kong
- Riyadh
- Erlangen
- Karlsruhe
- Berkeley
- Munich
- Abu Dhabi
- Frankfurt
- Nuremberg
- Newcastle upon Tyne
- Nottingham
- London
- Oslo
- Frankfurt
- Renningen
- Karlruhe
- Moscow
- Vienna
- Budapest
- Istanbul
- Dubai
- Singapore
- Abu Dhabi
- Gurgaon
- Noida
- Pune
- Shanghai
- Perth
- Hong Kong
- Austin
- Atlanta
- Orlando
- Pittsburgh
- Asheville
- Foster City
- Nottingham
- Sao Paulo
- Seville
- London
- Oslo
- Frankfurt
- Renningen
- Karlruhe
MindSphere Application Centers – Creating value for the customer

**Algonquin College, Canada University building**
- $3.7 million annual cost savings

**Amtrak, U.S. Rolling stock**
- 99% availability and reliability of rail vehicles guaranteed

**Deutsche Bahn Interlocking Bremen**
- > 80% failures from blocked or faulty point switches predicted and mitigated
MindSphere Application Centers – Creating value for the customer

U.S. utility, Jacksonville Grid infrastructure

$1 million savings per year with advanced metering

Eletrobrás, Brazil Power supply

50% reduction in non-technical power losses of $150 m

Siemens Electronics Manufacturing, Erlangen

from 25 to <7 days delivery time plus quality enhancement
Siemens is driving digitalization on all levels

Clear and focused R&D capital allocation to drive differentiation

Leverage domain know-how, digital portfolio and customer relationship

Growing digital businesses by more than 10 percent

Speed and scale