Quantum leap in digital

Guido Jouret, Chief Digital Officer
About me…

**Academic**
- Imperial College London
- WPI
- OSU

**Professional**
- Nokia
- Envision
- Cisco
- Ipsen

**Products**
- Various industrial products and components
What it needs to create customer value through digital

- **Customer value**

- **Accelerators**
  - Industrial collaboration platform
  - Horizontal leverage and vertical focus

- **Capabilities**
  - Master the control loop
  - End-to-end solutions & services

- **Foundation**
  - Installed base, customer access
  - OT\(^1\), industry & digital expertise

\(^1\)Operational Technology
Unlocking the ABB potential in digital

ABB Ability™: creating one common offering for digital end-to-end solutions

Build on customer trust, domain expertise, deep process knowledge

- Open access, intelligent cloud
- New end-to-end digital solutions
- Closing the loop with connected devices

Digital ABB offering across businesses: integrate, penetrate, replicate
Far-reaching partnership with Microsoft
Developing next-generation digital solutions

- End-to-end digital solution
- Closing the loop at every level
- Customer access and trust
- Domain and process expertise
- Intelligent cloud platform
- Mastery of the control room
- Connected devices, systems

Customer benefits

- Integrated digital platform – from device to system to cloud
- Combined strength – each partner leading in its respective area

Together building the world’s largest industrial cloud platform
ABB’s end-markets are at the beginning of digitalization

Note: relative size of industry for advanced economies
Source: ABB analysis
### ABB already delivers unique digital value to customers

Examples of customer value creation with available solutions

<table>
<thead>
<tr>
<th>Industry</th>
<th>Solution</th>
<th>Customer benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>Asset Health Center</td>
<td>reduction in outage time, less maintenance</td>
</tr>
<tr>
<td>Mining</td>
<td>Underground</td>
<td>more uptime, lower energy consumption</td>
</tr>
<tr>
<td>Automotive</td>
<td>Robotics</td>
<td>faster planning, less downtime</td>
</tr>
<tr>
<td>Marine</td>
<td>Integrated Operations</td>
<td>fuel savings, less maintenance and repair, less administration</td>
</tr>
<tr>
<td>Building</td>
<td>Automation</td>
<td>lower energy consumptions, more comfort</td>
</tr>
</tbody>
</table>
Digital solutions for transmission & distribution

ABB’s end-to-end asset management

Massimo Danieli, Managing Director of Business Unit Power Grid Automation
ABB has a huge opportunity to leverage the energy revolution

**Relevance**

- $80 bn annual costs from power interruptions to US electricity consumers\(^1\)
- > 95% of electricity goes through substations\(^2\)
- $160 bn annual OPEX and $180 bn CAPEX spending in the utility industry (transmission & distribution)\(^3\)

**Challenges**

- In mature economies a significant portion of power grid assets have reached the design lifespan
- Critical substation assets have isolated condition monitoring systems, if any
- Renewable energy needs flexible transmission
ABB unlocks significant customer value through digital

Bridging the gap between the physical and digital worlds

Network management center
Management and operation of the power grid

ABB asset health center
Data collection and advisory services

Digital Substation
Efficient transmission and distribution of electricity
ABB unlocks significant customer value through digital

Higher efficiency in operation and maintenance

- **50% OPEX savings** for transformers and breakers
- **Up to 50% reduction in outage time**
- **50% CAPEX savings** related to footprint reduction
- **80% CAPEX savings** on copper cables
- **Up to 40% reduction in installation time**
ABB unlocks significant customer value through digital
Resulting in $360,000 annual savings per substation

$360,000 / substation / year
savings today through services and software
ABB unlocks significant customer value through digital

$23 bn in potential customer savings throughout the transmission and distribution market

$23 bn
yearly saving potential through services and software

$360,000 / substation/year
x
65,000 substations¹

Replicate risk-based fleet maintenance approach in other ABB markets

Integrate and pull-through ABB and third-party offerings

¹High-voltage, air-insulated substations
Digital solutions for underground mining

ABB’s integrated mining offering

Clive Colbert, Global Product Group Manager – Service Business Unit Process Industries
ABB has a huge opportunity to connect existing islands of information in underground mining

**Relevance**

18 tons of minerals and metals are produced annually per person in developed countries\(^1\)

>7,5 mn people working in underground facilities\(^2\)

$230 bn annual OPEX and $60 bn annual CAPEX spending in the underground mining industry\(^3\)

**Challenges**

Declining ore grades, deeper and more complex underground mines in more remote locations

Inefficient utilization of mobile machines

High energy consumption
ABB unlocks significant customer value through digital

From the ventilation system to the cloud – ABB remote control center closes the loop

Customer operations center
Management of mining operations

ABB remote control center
Data collection and advisory services

Mine operations
Mining equipment, process automation system
ABB unlocks significant customer value through digital
Optimizing mining processes in real-time

Customer operations center

ABB remote control center

30 – 50% energy savings in mine ventilation

5% uptime improvement of mine hoists and gearless mill drives
ABB unlocks significant customer value through digital

Resulting in $5 mn annual savings per underground mine

$5 mn / underground mine / year

savings today through services and automation
ABB unlocks significant customer value through digital

$7 bn in potential customer savings across the underground mining market

$7 bn
yearly saving potential through services and automation

$5 mn / mine / year
x
1,040 underground mines

Plus 1,900 grinding applications

Replicate remote services, power & maintenance systems and plant- / enterprise- level solutions for other industries

Integrate and pull-through ABB and third-party offerings
Digital solutions for automotive robotics

ABB’s engineering and operations offering

Per Vegard Nerseth, Managing Director of Business Unit Robotics
ABB has a huge opportunity to shape the automotive industry

**Relevance**
With >500,000 units, the automotive industry is the largest user of industrial robots\(^1\)
90 mn cars are produced annually\(^2\)
$860 bn annual OPEX and $215 bn annual CAPEX spending in the automotive industry\(^3\)

**Challenges**
Shorter launch cycles for car models
Insufficient shop-floor commissioning tools
$1.3 mn is the average cost of one-hour maintenance delay in a car factory\(^4\)
ABB unlocks significant customer value through digital

Optimizing the whole value chain: engineering, commissioning, operations and maintenance

Robot Studio

Automotive factory
Industrial robots in manufacturing process

Customer production planning
Coordination of manufacturing process

Connected Services

ABB Analytics Hub
Real-time performance analysis

Automotive factory
Industrial robots in manufacturing process
ABB unlocks significant customer value through digital

Robot Studio: engineering efficiency and faster ramp-up to full production volume

**Robot Studio**

**Automotive factory**
Industrial robots in manufacturing process

**Customer production planning**
Coordination of manufacturing process
ABB unlocks significant customer value through digital

Connected Services: improved performance and reliability with less downtime
ABB unlocks significant customer value through digital
Optimizing planning and production

- **25% reduction** in installation costs
- **25% reduction** in unplanned down-time
ABB unlocks significant customer value through digital
Resulting in $19 mn annual savings per plant

$5 mn / plant
CAPEX savings today through software

$19 mn / plant / year
OPEX savings today through services
ABB unlocks significant customer value through digital
$15 bn in potential customer savings across the market

$15 bn
yearly savings potential through services and software

$19 mn / plant / year
x
750 plants

Integrate and pull-through ABB and third-party offerings

Replicate
planning and production solutions to other industries (e.g. electronics, food & beverage)
Digital solutions for marine industry

ABB Integrated Operations

Juha Koskela, Managing Director of Business Unit Marine and Ports
ABB has a huge opportunity to drive efficiency in marine industry

**Relevance**
- Global fleet of more than 90,000 vessels at sea\(^1\)
- Consuming >400 mn tons of fuel per year\(^2\)
- $450 bn annual OPEX spending in marine industry\(^3\)

**Challenges**
- New environmental, energy-efficiency and safety regulations
- Overcapacity, low freight rates, slow economic growth
- Incomplete and disconnected operational information

\(^1\)Clarkson data; \(^2\)ABB estimates; \(^3\)McKinsey & Company
ABB unlocks significant customer value through digital

From the propeller to the cloud – ABB Integrated Operations closes the loop

ABB Integrated Operations Center
Real-time performance analysis

Customer operations center
Manages fleet of vessels

Vessel
Onboard optimization and integration of information and functions
ABB unlocks significant customer value through digital

Higher productivity in overall operations and on the vessel

- 20% savings in administration and coordination
- 20% savings in maintenance and repairs
- Up to 5% fuel savings
ABB unlocks significant customer value through digital

Resulting in $350,000 savings per vessel

$350,000 / average vessel / year savings today through services and software
ABB unlocks significant customer value through digital

$32 bn in potential customer savings across the market

$32 bn
yearly savings potential through services and software

$350,000 / vessel / year
×
90,000 vessels

Replicate
Integrated Operations solutions to other ABB customer sectors (e.g., ports, mining, oil & gas, pulp & paper, power generation)

Integrate and pull-through ABB and third-party offerings
Digital solutions for buildings
ABB’s connected, integrated control offering
Mike Mustapha, Managing Director of Business Unit Building Products
ABB has a huge opportunity to drive digitalization in buildings

Relevance

50% of the world’s population live in cities, 70% in 2050

Buildings consume approximately 60% of the world’s electricity

$600 bn annual OPEX spending on buildings

Challenges

Inefficient energy use
Interoperability of intelligent solutions
Increasing speed of innovation requires future-proof platforms
ABB unlocks significant customer value through digital
Intelligent building functions controlled by communications protocols

- Daylight harvesting / lighting / blind controls
- Temperature / air quality controls
- Safety / emergency solutions
- Room access controls
- Audio / visual controls
- Power management
ABB unlocks significant customer value through digital
Making buildings smart with end-to-end solutions

Daylight harvesting / lighting / blind controls
Temperature / air quality controls
Safety / emergency solutions
Audio / visual controls
Room access controls
Power management

Up to 30% energy savings and 20% lower maintenance costs in intelligent buildings
ABB unlocks significant customer value through digital

$15 bn in potential customer savings throughout the hospitality buildings market

$15 bn
yearly savings potential through building control

$2,500 / hotel room / year
x
5.8 mn rooms in 4/5 star hotels (top 10 hotel chains)

Integrate and pull-through ABB and third-party offerings

Penetrate

Replicate

replicate smart building equipment to shopping malls, airports, offices, sport arenas, etc.
Customer value creation and ABB opportunity to capture

Showcases in 5 markets: $90 bn customer saving potential

ABB opportunity: $2 bn

Full potential in 5 markets: $315 bn customer saving potential

ABB opportunity: $6 bn

Full potential across 15 ABB key markets: $988 bn customer saving potential
ABB Ability™ to grow through digital

>$20 bn annual business opportunity to be captured
What’s next: integrate, penetrate, replicate

Leverage digital services across all market verticals

**Penetrate:** more customers

**Replicate:** repeatable solutions

**Integrate:** ABB Ability™
ABB Ability™