Trends are forcing us to the new business models

Mikko Uuskoski
Beckhoff Automation Oy
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Source: Kagermann H. : Change through digitization-Value creation in age of industry 4.0. 2015
Trends

- PC-based control
- IoT
- IIoT
- Industry 4.0
- CPS
Origin & Definition: Internet Of Things

Source: Mobilepundits
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Source: Designnews
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- Display
- Hard disk
- Flash memory
- Ethernet
- USB
- RS232 C
- Modem

Windows

Application software

Programming workbench for PLC/NC

Real-time PLC, NC, CNC

General process interface (fieldbuses, Ethernet)

- Drives
- I/O modules
- ADCS

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Complexity

Measurement, Analysis, Condition Monitoring Robotic, Vision

Motion Control

Industrial PC
Operator panel, Visualisation, Data back-up

PLC Control

Standard Automation PC Control
Integration of
- Visualisation
- PLC
- Motion (PTP, NC, CNC)
- Closed Loop Control
- Communication
- Special functions

Scientific Automation PC Control


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Integration Capacity (BT) vs. Technology Node (nm) vs. Number of CPU Cores

- 2018: 128 cores
- 2018: 8 nm

Beckhoff Corporate Presentation 26.10.2016
In 2020, PC Control technology will be 32 times more powerful than today!

Today’s control programs will use only 3% of the 2020 CPU`s!

The usage of the remaining 97% resources will decide your competitiveness!

Scientific Automation is using exactly these resources for advanced control technology
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Trends =

1. Calculating power
2. Connectivity
3. More software

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B2B companies and customer requirement in value chain
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Automation integration interest groups

- R&D
- After sales
- Engineering
- Sales
- Start up
- Financiers
- Purchasing
- Technical support
- Sub contractors
- Production
- Management
- Customers
- Quality control
- Competitors
- Warehouse
- Finance
- Service
- Purchasing
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<th>Variables of the integration</th>
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<td>Modularity in R&amp;D</td>
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Source: Accenture; Driving unconventional growth through the industrial internet on things
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**THE FIVE FORCES THAT SHAPE INDUSTRY COMPETITION**

Smart, connected products will have a transformative effect on industry structure. The five forces that shape competition provide the framework necessary for understanding the significance of these changes.

- **Threat of New Entrants**
- **Bargaining Power of Suppliers**
- **Rivalry Among Existing Competitors**
- **Bargaining Power of Buyers**
- **Threat of Substitute Products or Services**

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The New Technology Stack

Smart, connected products require companies to build and support an entirely new technology infrastructure. This “technology stack” is made up of multiple layers, including new product hardware, embedded software, connectivity, a product cloud consisting of software running on remote servers, a suite of security tools, a gateway for external information sources, and integration with enterprise business systems.

PRODUCT CLOUD
- Smart Product Applications
  - Software applications running on remote servers that manage the monitoring, control, optimization, and autonomous operation of product functions
- Rules/Analytics Engine
  - The rules, business logic, and big data analytical capabilities that populate the algorithms involved in product operation and reveal new product insights
- Application Platform
  - An application development and execution environment enabling the rapid creation of smart, connected business applications using data access, visualization, and run-time tools
- Product Data Database
  - A big-data database system that enables aggregation, normalization, and management of real-time and historical product data

CONNECTIVITY
- Network Communication
  - The protocols that enable communications between the product and the cloud

PRODUCT
- Product Software
  - An embedded operating system, onboard software applications, an enhanced user interface, and product control components
- Product Hardware
  - Embedded sensors, processors, and a connectivity port/antenna that supplement traditional mechanical and electrical components

EXTERNAL INFORMATION SOURCES
- A gateway for information from external sources—such as weather, traffic, commodity and energy prices, social media, and geo-mapping—that informs product capabilities

INTEGRATION WITH BUSINESS SYSTEMS
- Tools that integrate data from smart, connected products with core enterprise business systems such as ERP, CRM, and PLM

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Questions?