Digital transformation at thyssenkrupp

ifu workshop 2016, Ruhr-University Bochum, Germany

November 25th, 2016 | Dr. Michael Picard, Head of Architecture, Digital Transformation & IT-Infrastructure Management
thyssenkrupp AG

engineering.tomorrow.together.
Agenda

1  thyssenkrupp at a glance
2  (Digital) opportunities and challenges
3  Process and IT management is a key partner in digital transformation
4  Transformation programs and examples @ thyssenkrupp
5  Path forward
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You think this is thyssenkrupp?
thyssenkrupp in support of its customers
Managing the challenge together
Diversified industrial company: Our business areas

Key indicators – fiscal 2014/2015

<table>
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<tr>
<th>Components Technology</th>
<th>Elevator Technology</th>
<th>Industrial Solutions</th>
<th>Materials Services</th>
<th>Steel Americas</th>
<th>Steel Europe</th>
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</thead>
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|                |                     |                      |                   |                |              |
| Sales [€ mn]¹  | 6,753               | 7,208                | 6,256             | 14,254         | 1,773        | 8,697        |
| EBIT [€ mn]²   | 313                 | 794                  | 424               | 206            | -138         | 492          |
| Employees³     | 29,627              | 51,335               | 19,388            | 20,226         | 3,725        | 27,601       |

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Video: engineering. tomorrow. together
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<th>Alibaba</th>
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*Quelle: MIT Technology Review 2015*
Combining engineering and IT – Digital future

In the past, industry was focused on productivity –
In future, the connection of value chains will be the key of success
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The environment has changed

Digitalization is going forward

50% of the qualification for an industrial technician involves IT activities

Internet of Things
Mobile Computing
Technology push
Hybrid IT & Cloud Computing
Social Media
Big Data

50%
Digital transformation, just try an learn!

Augment the traditional product centric business by digitally enabled advanced services and product-service systems

Digital levers for advanced services

- Customer touchpoint and channel consistency
- Real-time data visualization and reporting
- Information-based customer services – “Data to become the product”
- Remote monitoring of production lines to improve quality of service, throughput and uptime
- Predictive/Preemptive maintenance by applying big data methods
- Robotics and artificial intelligence algorithms
- … and many more

Traditional product centric business

„Selling a car“

You will be surprised, great opportunities!

Quellen: http://www.pkw.de/ratgeber/auto-verkaufen/auto-verkaufen-tipps/main.jpg (links), deinewege.info (rechts)
Digital transformation - thyssenkrupp’s objectives

Seamless communication and integration of processes allows to …

- React more flexible on customer requests
- Reduce cost
- Increase quality
- Increase throughput
- Reduce environmental footprint
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Transformation business & IT management

- Vision, Innovation
- Business strategy
- Business organization
- Business processes

Vision, Innovation
- Digitalization and technology push
- IT strategy
- Organization and processes
- Fully integrated system architecture

IT management
Enterprise architecture as a foundation for digital transformation

Business Architecture / Model
Strategy, Capabilities, Organization, Markets, Customers, Products/Services/Operations

Pro-Active
Enable Business Strategy
- Enhanced User Experience
- New trends and innovation
- Digitalization
- Internet of Things/Everything
- Artificial Intelligence, Algorithms

Core
Keep the Business running
- Baseline architecture (as-is)
- “Connect the dots”
- Set standards
- 360° view of IT@tk

People
Customer
User Experience

IT Governance / IT Process Architecture
Architecture Baseline
IT Security
IT Strategy
Bimodal IT

Agile and fast
Step by step solutions
Customer and business centric
Short life cycles

Reliable and stable systems
Secure solutions to support business models and projects
Stable technology basis for innovation
Resilient, secure, fast

Digital business models and transformation
Governance
Change

The digital race is a marathon as well as a sprint
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Digital Transformation at thyssenkrupp is based on a comprehensive framework in support of an integrated thyssenkrupp and advanced services to its customers.

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<th>Product and Service Delivery to thyssenkrupp’s customers</th>
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<td>Customer experience</td>
<td>Operational processes</td>
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<td>Customer understanding</td>
<td>Process digitization</td>
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<td>Top line growth</td>
<td>Worker enablement</td>
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<td>Customer touch points</td>
<td>Performance management</td>
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**Product Lifecycle Management**

**Data and Process Harmonization**

**IT Infrastructure Platforms**

**Digitally enabled Services**

**Digital Imperatives**

**Digital Fields of Action**

**Digital platforms as a foundation for business execution**
Building the basic IT Infrastructure platform first

Future Workplace

Global Network

Cloud-based services

Central Data Centers
Harmonize and optimize thyssenkrupp’s data & business processes

**Status Quo**

> 200 ERP Systeme

SAP + Non-SAP

**Target state**

20+ ERP Systeme

Business Area Templates

SAP HANA

- Corporate
  - Core template + library

**daproh**

Data and process harmonization

Operating control
Best-in-Class processes

Transparency

Reduction of complexity and costs
Example: System Engineering
Seamless Engineering on Site
On Site Monitoring System

Service Order handling:
- Spare part handling
- Retooling
- Relocation
Virtual Commissioning
Integrated Engineering

Controls / PLC

- HMI
- SPS

Visualization

- Realtime Simulation incl. Bus Simulation
- 3D-Visualization
  Simulation of Material Flow / Logistics
  Original Robot Programs

WinMOD
Virtual Commissioning

- HMI and PLC
- System Behavior
- Virtual 3D-Modell
- 3D Model of the customer line
- OFFLINE-Programming
Save Human Robot Collaboration to Increase Flexibility and Productivity

Clear separation of human and robot / robot does not recognize the human worker.

Collaboration between human and robot / The robot recognizes the human person
Example: Cam shaft production
Smart Factory
Example: Real time controlled assembly and machining of camshafts to avoid errors and reduce cycle time

Status of previous machine and update of process parameters
Example: Material Services
Optimization of stock turn
Just-in-time-delivery.
Inventory and stock management.
Supply-Chain-Management.

Optimization the use of loading and unloading slots for trucks
Online retail shop “Materials4me”, thyssenkrupp Material Services
New Digital frontend

Goals

• Set-up an online retail shop besides existing b2b portals
• Offer full eCommerce functionality incl. online payment

Measures

• Go-Live of https://www.materials4me.co.uk/
• Develop the business by using the deep level of expertise in digital marketing of existing OnlineMetals.com with e.g.
  • 550,000 e-mail marketing messages sent per month
  • 11,000 Google search keywords
  • 36,000 unique SKUs live in Google shopping ads
  • 13% of incoming traffic from mobile devices

Screenshots

SKU: Stock keeping Unit
Example: Elevator maintenance
Big Data and Predictive Analytics – better uses of already available information

Great opportunities by utilization of the already available information/Big Data!

ERP = Enterprise Resource Planning
MES = Manufacturing Execution System
PLM = Product Lifecycle Management
Big Data and Predictive Analytics
Optimization of services at thyssenkrupp Elevator (MAX)

Blue Box has a standardized interface to the cloud

Blue Box

TCP/IP
GSM/POTS
standardized interface

Microsoft Cloud Services

ERP*

 tk E Software

* *) ERP: Enterprise Resource Planning

Big Data and Predictive Analytics
Optimization of services at thyssenkrupp Elevator (MAX)
Example Elevator Maintenance: Big Data / Analytics
thyssenkrupp Elevator and Microsoft cooperate in data analysis

Technicians at thyssenkrupp's call center in Seoul, South Korea

Goal: Increasing the efficiency of maintenance and services for thyssenkrupp's elevators
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Video: Microsoft HoloLens
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Modern Process & IT Management …

... triggers digital business and product innovation

... conducts complex transformations of organization, processes, and culture

... is a production factor within the digital integration
Digital Transformation/Industrie 4.0 creates significant challenges for enterprises and employees

Opportunities and challenges of tomorrow's workplace

- Self-organizing
- Quality
- Ambiguity
- Security
- Gen Y
- Robot as a colleague
- Complexity
- Dynamic
- Customer orientation
- Work-life-balance
- Resource efficiency
- Ergonomic
- Uncertainty
- Efficiency
- Volatility
- Linked

Qualification of the employees

- Recruiting of "adequate" employees and "skills"

Modern Leadership and company culture

- New flexibility of companies and employees

Empowering and Exciting People at thyssenkrupp
Digital Transformation: Impact on labor market and work profiles

Job Growth in Germany will vary significantly by category of work and industry

Source: BCG analysis „Man and machine in Industry 4.0“
Thank you for your attention!