HEAVY MACHINERY

Opportunities for new business models and artificial intelligence on the construction site.
THE DEVELOPMENT TOWARDS CONSTRUCTION 4.0 IS ACCELERATED BY VARIOUS CHALLENGES

Challenges for construction machine manufacturers

- Need for increased productivity
- Big Data
- Demand for Sustainability
- Need for increased innovation
- Emission reduction
- Fierce competition
- Increasing usage of analytics
- Cost and time pressure
- Data Security
NEW TECHNOLOGIES HELP TO ESTABLISH A FLEXIBLE AND OPTIMIZED VALUE CHAIN

Heavy Machinery Opportunities

Construction Management Software
Software allowing engineers to more efficiently manage their resources, construction progress, machinery, etc.

Digital Twin
Creation of a Digital Twin allows continuous and on-demand machinery insights as well as ongoing customer usage feedback.

Automated Construction Forecast
Data collection & analysis of soil and other materials to improve research & development.

Robotics & Drones
Robotic software, drones or intelligent construction machines performing various construction functions more efficiently.

Insights Driven Operations
Intelligent data usage with AI & predictive analytics helps making better decisions, saving energy, increasing efficiency & optimizing planning.

Connected Services
IoT services enable new digital business models.

Intelligent Automation
Automation of complex processes through the implementation of advanced software.

Market Places
Connecting directly manufacturer, suppliers and consumers without any middlemen.

Configurator
Interactive customization platforms for construction machinery.

Functions on demand
Individual machinery functions for a limited, need-based period of time (e.g. increased power).

Sensors
Smart sensors collecting data, helping workers to monitor machines, weather & materials quality.

Connected Machines
Seamless communication between heavy machinery and other related systems.

= deep dive information on following pages

Digital Customer
...trends provide growth opportunities through increased customer understanding, customer touch points and a superior customer experience.

Digital Operations
...trends create a momentum for operational efficiency through process automation, increased connectivity and production transparency.

Digital Business
...trends enable digitally modified business or new business models based on disruptive innovations in the market.
OUR INSIGHTS DRIVEN USE CASES CREATE SUSTAINABLE AND SCALABLE BUSINESS VALUE

Insights Driven Operations - Our Offering

**Capgemini Approach**
- We combine **data science capabilities** with a **business driven mindset**
- Our **industry know-how** enables tailored use cases to our clients **specific needs**
- Our collaborative approach ensures **sustainable integration** into the client organization

**Data Science Expertise**
- **Artificial intelligence** for assembly line design or for predictive maintenance
- **Computer vision and machine learning** for detection of quality problems
- **Natural language processing** to enable analytics on written manufacturing documents

**Client Benefits**
- **Business impact** (improved quality, improved uptime, increased revenues, higher efficiency)
- **Scalability** in delivery model and across value chain
- Solutions embedded into organization, technology and processes for **sustainable results**

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**Insights Driven Operations – Example Use Cases**

**Customer analysis**
Identify the most "expensive" system failures from a user's point of view by analyzing unstructured data (e.g. user forums, product utilization)

**Quality Insights**
Integrate analytically generated insights about the manufacturing process into existing assembly lines and improve product quality

**Cost prediction**
Predict scrap and exposure rates by customer based on individual usage to enable new, usage-based business models

**Industrial setup design**
Use AI to plan and optimize the industrial setup of a complex assembly line including assembly order and required tools

**Predictive quality**
Conduct failure root cause analyses and predict defects of assembly parts based on production sensor data to increase product quality

**Predictive maintenance**
Identify anomalies & predict necessary maintenance activities to improve efficiency, avoid downtime, improve customer satisfaction and reduce costs based on business models

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Product Life Cycle Stages: Design | Production | Services

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WE CREATED ANALYTICAL QUALITY SOLUTIONS TO REDUCE COST AND BOOST PRODUCTIVITY

1. Insights Driven Operations - Project Reference

### Situation

Our client, a leading avionics OEM, faces high cost of non quality along the complete value chain. Furthermore, manual evaluation and decision taking results in high workload.

### Solution

We supported the integration and linkage of quality data across units and locations to generate new insights by end-to-end KPI monitoring and search engines as well as AIs to predict and prevent quality issues.

### Benefit

Our tailored quality solutions reduced cost by easy access to quality knowledge including outcome predictions and reduces workload by automatization of complex analyses.

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**Analytics product delivery approach**

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Sprint 0</th>
<th>Product Life Cycle</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of analytics use case, business case &amp; funding</td>
<td>Deep dive into product, business value, team sizing, data &amp; architecture</td>
<td>Development of the product together with end users in agile mode</td>
<td>Maintain the product and associated service level</td>
</tr>
</tbody>
</table>

Our proven scalable (>100 use cases) agile delivery approach for analytical solutions, considering business needs, data and architecture, ensures user-centric solutions with high quality and success rate.

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**Tailored digital solutions**

<table>
<thead>
<tr>
<th>Enterprise Search</th>
<th>Data Explorer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search all quality data like in Google to find problem solving procedures for your quality problem</td>
<td>Explore and navigate the connected datasets to investigate quality issues and relationships</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quality Reporting and Alerting</th>
<th>Predictive Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatize report generation and steer quality processes with real time KPIs and notifications quality problem</td>
<td>Lay the foundation for predictive and preventive quality use cases on shop floor or machine level</td>
</tr>
</tbody>
</table>
CONNECTED SERVICES CREATE NEW REVENUE AND HIGHER CUSTOMER SATISFACTION

2 Connected Services - Our Offering

**Use cases**
- Digitally enable existing services e.g. usage-based insurance
- New connected services e.g. monitoring and predictive maintenance
- Farm-site related services e.g. drone monitoring

**Benefits**
- Increased and sustained revenue by higher margins and automated processes
- Better fulfillment of customers’ needs and satisfaction
- Differentiation from competitors and contrary to commoditization

**Capabilities**
- Create a customer centric portfolio of digital and non-digital services
- Define how to deliver services with own and dealer capabilities
- Design prototypes, develop rollout and how to go-to-market approach

Customer Centric Approach for Connected Services / New Business Models

# Opportunity spaces for new digital business
WE ENABLE NEW SERVICE REVENUE WITH A CUSTOMER-CENTRIC AFTERSALES BUSINESS

Connected Services - Project Reference

Our client, a leading multi-brand agricultural equipment manufacturer, decided to drive a shift from simply selling finished goods and parts towards providing digital after sales services.

Capgemini supported the client in developing a comprehensive portfolio of their commercial services offer for connected and non-connected machines to boost customer loyalty.

Together, we developed end-to-end processes and new service-based business models along the implementation roadmap, resulting in additional revenue streams.

The service portfolio analysis adapts to company capabilities:

- Inclusive digital service offering that is deeply connected with business cases
- Matching complexity with capabilities allows fast implementation of best-in-class after-sales service

Sustainable increase of customer loyalty with our capability model:

- Required key-capabilities throughout the organization to enable long-term competitiveness in delivering customer-centric solutions
IDENTIFYING THE RIGHT PROCESS CHANGES & AUTOMATION SOLUTIONS FOR YOUR NEEDS

Intelligent Automation - Our Offering

<table>
<thead>
<tr>
<th>Use cases</th>
<th>Benefits</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Robotic Process Automation</strong> (RPA) to manage high-volume, repetitive tasks</td>
<td><strong>Lower error rate</strong> through supportive technologies</td>
<td><strong>Mass automation</strong> of manual entries Implementation of <strong>Chat- &amp; Voicebot</strong> with new user interfaces</td>
</tr>
<tr>
<td><strong>Natural Language Processing</strong> (NLP) and Natural Language Generation (NLG)</td>
<td><strong>Revenue boost</strong> by identifying &amp; maximizing (sales) opportunities as well as increased operational efficiencies</td>
<td><strong>Prediction of future customer actions and value</strong> as well as <strong>Read-out and transformation of PDF into structured data</strong></td>
</tr>
<tr>
<td><strong>Machine learning</strong> enables user-level automation without changing existing processes or systems</td>
<td><strong>Superior customer experience</strong> due to better analytics insights</td>
<td></td>
</tr>
</tbody>
</table>

Intelligent Automation Service Offering

**Act: RPA**
Set of technologies that uses software as a ‘virtual FTE’ to interpret and manipulate existing software applications (e.g. ERPs) and to execute repetitive rule-based processes.
**i.e. IT process automation, ERP integration**

**TALK: Interact**
Listening, reading, corresponding, writing and responding to IA solution for an intuitive customer interaction i.e. Chatbots, virtual agents, NLP/NLG

**WATCH: Monitor**
Technology that watches and records key business data to create knowledge i.e. CCTV, IoT sensors, ICR

**THINK: Analyze**
Detect patterns & recognize trends by applying algorithms to knowledge to determine appropriate action i.e. Machine learning, neural networks

**REMEMBER: Know**
Storing and finding info effectively using tools and components like databases and search engines. i.e. Knowledge extraction, case management
WE DEVELOPED AN ACTIONBOT THAT UPDATES MASTER DATA AUTOMATICALLY

### Intelligent Automation - Project Reference

<table>
<thead>
<tr>
<th>Situation</th>
<th>Solution</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our client, a leading company of the manufacturing industry, decided to increase its customer experience by applying intelligent automation</td>
<td>We implemented a Chat- and Voicebot starting with the input channel chat and clients’ wish to change their postal address. The scalability of AI and RPA thus allowed us to extend the complexity of the use case</td>
<td>The AI and RPA capabilities and functions are scalable. Therefore, we combine the strength of AI and rule-based RPA. Approved data is entered without human error potential</td>
</tr>
</tbody>
</table>

**Smart automation via Chatbot / Voicebot**

**Input Channel:**

- Chat
- Phone
- Chatbot
- Voicebot
- ERP-System

- Human interaction
- No Human interaction
- No Human interaction
- No Human interaction

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Capgemini Invent combines key digital capabilities with deep sector expertise.

Heavy Machinery  @Capgemini Invent
WE ARE LOOKING FORWARD TO WORKING WITH YOU

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