Business Platform AXOOM
Maximum Efficiency in Production

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Entry</td>
<td>Order Management</td>
<td>Procurement</td>
<td>Production Planning</td>
<td>Shipping</td>
<td>Reports &amp; KPIs</td>
</tr>
<tr>
<td>Direct online order and customer acquisition</td>
<td>Digital and 100% efficient</td>
<td>Instant material purchasing</td>
<td>Fully automated shop floor optimization</td>
<td>Automated and cost efficient logistics</td>
<td>Full business transparency</td>
</tr>
</tbody>
</table>

Source: AXOOM

Making the transition to Industrie 4.0, step by step

Initial situation
AXOOM, founded by machine tool manufacturer TRUMPF in 2015, addresses the problem of growing complexity in the manufacturing industry – for example, those caused by declining batch sizes. Modern machines turn out parts so quickly that they offer very little potential to reach greater productivity. The situation is entirely different when it comes to the processes that precede and follow the actual production of a part – from taking a customer’s order, then to materials procurement and order scheduling, and through to invoicing – there are many opportunities to save time and expense.

Solution
The key is an open business platform that is holistic in design and encompasses the entire value chain. AXOOM will be available to all customers, their suppliers and service contractors, as well as to other partners. Components made by different manufacturers within the production value chain can be networked together and are thereby able to work together intelligently. This shall help to simplify process steps within production, synchronize them, and bring overall productivity to a new and higher level.

Benefits at a glance
AXOOM makes consistency and transparency possible, along the entire value chain.
• Order Management enters orders digitally and manages them efficiently.
• Resource Management automatically reorders material – just when needed – and gives full transparency.
• The module Shop Floor optimizes productions paths for all orders.
• Logistics enables an efficient provider selection and processing.
• Reporting brings transparency in everyday business by providing all important data fast and at any time.
Solutions for higher productivity in production

**Initial situation**
Since B&R has introduced its X20 PLC series in 2005, both the number of available modules and their production quantities have risen drastically. This has been accompanied by demands for greater variety, lower cost, improved quality and smaller batch sizes. New production equipment was needed to achieve these goals.

**Solution**
B&R developed new, fully automated production cells, which can now produce more than 200 different types of PLC modules.

The cells are controlled by B&R X20 PLCs that communicate directly with the ERP system. The assembly, testing and labeling stations check each serial number in the ERP system in real time to determine individual parameter settings and which tests are required for the given module type. Fractions of a second later the station performs the tests and sends the results to the ERP system.

**Benefits at a glance**
- Increased productivity and profitability
- Improved transparency and quality with integrated production tracking
- Reduced unplanned downtime
- Time/cost savings through predictive maintenance based on condition monitoring

The cells communicate at the line level with B&R’s APROL factory automation software. APROL records production data and evaluates it. Based on this data, predictive maintenance plans are created to minimize unplanned downtime and increase productivity. A variety of dashboards for OEE, production quality and cycle time data displays current and historical information about the state and efficiency of production.
Software concept for the smart factory

Initial situation
Bachmann is working continuously on new automation solutions which will bring the machine building sector a considerable way closer to the vision of the smart factory.

Solution
Bachmann is focusing on automation solutions for optimizing the vertical data flow in order to optimize machine monitoring and service management, as well as to prevent unscheduled downtimes. This vision is now bearing the first ripe fruits in the form of the "Fleet Management System" (FMS) software module. A new concept which fetches data from the depths of the machine sensors and actuators and refines it into knowledge that can be used worldwide. On the global level this enables condition-based maintenance beyond the boundaries of plants and their owners.

FMS enables the quantity of the data collected worldwide as well as the quality of the information obtained to be considerably increased. This method allows machine builders and end users to reduce unnecessary maintenance costs as well as minimize unplanned downtimes so that the operating costs of a machine are reduced. The ability to plan service operations with condition based maintenance not only reduces costs but also increases machine availability. This is because the software module detects faults and signs of wear early on and communicates this for proactive protection directly to the right places.

Benefits at a glance
- Simple change from preventative to condition-based maintenance
- Feedback of real loads/data into development
- No corporate boundaries or geographical restrictions
- Use of existing sensor/actuator data
- Standard data aggregation – reduced for value addition
- Target-group oriented data management
- Limitless flexibility through the use of seamless web technology for in-house visualization

Source: Bachmann

FMS enables the data management of many plants beyond corporate boundaries with different authorizations.
Industrie 4.0

Initial situation
Due to a consolidation in the print industry over the past 20 years, huge multinational companies and highly automated internet-printers took over a large part of the printing market. These companies require highest machine availability and performance from manufacturers like Heidelberger Druckmaschinen AG (Heidelberg).

Solution
A modular range of services, developed and implemented, for ever increasing customer demands.

Basis for these new smart services is an IoT-platform for the transmission of machine log data as well as a high-tech big-data analytics system, which permanently analyses data of thousands of sensors of the printing presses. With this, indicators for approaching errors can be detected and handled early enough to prevent unplanned downtimes thanks to the expertise of our service specialists. The objective: highest machine availability.

Apart from technical data, the machines also transmit performance data which is used to analyze and monitor production processes. To improve the efficiency of the entire production system (people, machines and processes) the causes of losses in terms of time, speed and quality must be identified in order to find the best solution. Heidelberg covers all of this in a unique consulting service: Performance Plus.

Benefits at a glance
For customers:
- Comprehensive and sustainable consulting service
- Designed for individual customer requirements
- Up to six-figure savings throughout the duration of the project
- Increased output by up to 40%
- Minimized risk thanks to performance-related fees

For Heidelberg:
- Growth in service business
- USP for Heidelberg compared to the competition