Industry 4.0 Is Here

Revolutionizing Service Performance in the Chemical Industry

Survival of the Most Adaptable - "It is not the strongest that survives, nor the most intelligent. It is the one that is the most adaptable to change." Charles Darwin's statement from the 19th century is still valid today and applies to industry as well as nature.

Companies that foresee trends and adapt their business accordingly will be successful. They need a holistic business approach that covers all steps from the idea to the manufacturing of a product and then beyond to services.

Adaptability is more important than ever as we are entering a fourth industrial revolution. The first three industrial revolutions came about as a result of mechanization, electricity and IT. Now, the introduction of the Internet of Things and Big Data coupled with a transition to service revenues is ushering in a fourth industrial revolution, also known in Germany as "Industry 4.0." In the "smart factories" that are already beginning to appear, smart machines, storage systems and production facilities autonomously exchange information, trigger actions and control each other.

The embedded manufacturing systems are vertically networked with business processes within factories and enterprises and horizontally connected to disperse value networks that can be managed in real time - from the moment an order is placed right through to outbound logistics. This leads to a completely new approach to production, one that not only enables manufacturers to meet changing customer demands, but also addresses global challenges, such as resource scarcity and demographic shifts.

Trends Driving Change

A variety of market trends are leading to changes in the business environment: Companies are pressured more than ever to reduce time-to-market and increasingly must do so on custom orders - giving rise to the concept of the "batch of one."

• Service-driven models are taking off as companies not only sell a product but
also services around it. Leading companies are going so far as to sell outcomes.

- Global regulations need to be fulfilled, and sustainability challenges need to be considered, even before starting to produce a product.

Technology is helping the industry address these new challenges and opportunities in an unprecedented way: In the future, machines, products and materials are becoming "smart" through sensor technology.

Sensors can automate tasks, report performance levels, flag anomalies and generate alerts. Companies get insight into their business processes, measure performance, and run predictive analytics to forecast future outcome ("connected planet").

Sensor-driven data coupled with enterprise data will lead to a data explosion. According to market analyst firm IDC, the "digital universe" will grow from 2005 to 2020 by a factor of 300. This is driving the need for faster database technology to manage and analyze big data.

The frequent use of social media and innovation networks is another trend. This leads to a change in communication with customers, employees and business partners and to new business models. As an example, companies may ask their customers about their opinion on a new product, even before they start the development process, and they will leverage sentiment analysis to gain insight to rapidly modify their products to keep pace with changing requirements.

**Turning Challenges Into Opportunities**

SAP is adapting Industry 4.0 principles through the development of "Idea to Performance," a holistic business approach and a solution bundle to increase product and service performance. The approach enables full management of a product's entire life cycle from design to service within distinct scenarios.

**Box 1: Idea to Performance Integrated Solutions**

**Idea to Performance** enables fully integrated processes. The offering is a solution bundle of:

- R&D/engineering
- Manufacturing (e.g., manufacturing integration and intelligence, manufacturing execution systems)
- Sustainability (e.g., environmental health and safety management) solutions
- Enterprise asset management
The focus is on ensuring that the systems are smarter, faster and simpler. Smarter via insights provided by SAP HANA on converged operational and enterprise data. Faster by embedding this insight into integrated applications from idea to service. Simpler through 3-D visualization delivered on mobile devices.

The offering extends existing solutions with innovations. It aims to support companies to add value on four dimensions: Sustainable innovation, responsive manufacturing, operational excellence and aftermarket service.

- Sustainable innovation means supporting companies to have complete transparency on their portfolio, invest in their most profitable areas, and then speed up time to market for their products. As an example, Givaudan, a global leader in the fragrance and flavor industry, uses SAP EHS Management for its compliance checks. With the big data capabilities of SAP HANA, a fragrance designer can now automatically check the compliance status during the development process. What used to take hours can now be done in a few minutes. This accelerates time-to-market for new products and safeguards compliance if new regulations come into effect.

Responsive manufacturing aims at supporting companies to reduce their order fulfillment cycle times and cost, while at the same time increasing agility. The solutions enable companies to run variant processes for much more variant products. As an example, steel manufacturer Joris Ide profits from 15% faster production lead times and 50% fewer stock corrections.

"The latest implementation has boosted manufacturing efficiency and integrated all of our SAP systems," said Bernard Bossuyt, ICT manager, Joris Ide Group. "With SAP BusinessObjects solutions installed on top of SAP ERP and SAP MII (Manufacturing Integration and Intelligence), top management has immediate insight into manufacturing key performance indicators."

- Operational excellence aims to support companies to efficiently manage their assets. The solutions enable the view on the machines and help to keep them up and running, so to speak. This is done by not only combining machine data, but also by combining data from environmental health and safety, quality and energy data (IT-OT integration). As an example, Nova Chemicals improved maintenance scheduling compliance by 22% and time spent on reactive, emergency work by 47% with SAP Enterprise Asset Management.

- Aftermarket service solutions enable new business models and service scenarios for customers. They support contract management and billing, complaint, returns and depot repair, field service and service contract
management as well as multichannel customer service.

**Big Data, 3-D and Mobility**

Looking at those four dimensions, one thing is becoming clear: The only way businesses can succeed is by leveraging big data. Data from enterprise business applications is being coupled with operational data. The amount of data is growing exponentially. Companies also want to connect with their suppliers, partners and customers and to analyze and simulate production processes. This is only possible with big data capabilities, as offered by SAP HANA; 80% of decision-makers think access to the right information at the right time is critical to their business.

Another area that bears big potential is mobility: When mobile access is provided to employees, this brings about up to 40% higher employee productivity. Imagine a maintenance worker gets a working instruction on a tablet PC to exchange a valve of a machine. The worker receives step-by-step 3-D visual instructions to follow until the new valve is installed. After that, the worker confirms that the repair is done and this information is instantly available to management. This saves time and cost and increases transparency.

Idea to Performance is a holistic approach; nevertheless, customers might want to implement it step-by-step. They should revise their processes and solutions in use and decide in which of the four scenarios they would profit most from fully integrated processes. As a conclusion, let us keep it with Thomas A. Edison: "Vision without execution is hallucination."

**Autor(en)**

Scott Bolick, head of Idea to Performance, SAP

**Kontaktieren**

**SAP AG**  
*Dornierstraße 3*  
*88677 Markdorf*  
*Germany*  
**Telefon: +49 7544 9700**  
**Telefax: +49 7544 9701 10**