Supply Chain Management 4.0: Logistics within the bulk cement industry

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The 4 Stages of Industrial Evolution

1. Industrial revolution
   Introducing mechanical production machines powered by water and steam
   Industry 1.0
   End of the 18th century.

2. Industrial revolution
   Introducing mass production lines powered by electric energy
   Industry 2.0
   Beginning of the 20th century.

3. Industrial revolution
   Through the use of electronics and IT further progression in autonomous production
   Industry 3.0
   Beginning of the 70th.

4. Industrial revolution
   Based on cyber-physical-systems
   Industry 4.0
   Today

Level of complexity
Megatrends have considerable impact and drive structural changes in nearly all manufacturing sectors

- Changing demographics (growing world population, aging societies, increasing urbanization)
- Globalization & future markets (ongoing globalization, BRIC, beyond BRIC)
- Scarcity of resources (energy, water, other commodities)
- The challenge of climate change (increasing CO2, global warming, ecosystem at risk)
- Dynamic technology & innovation (technology diffusion, power of innovation, the age of life science, ubiquitous connectivity)
- Global knowledge society (know-how base, gender gap, war for talent, multiplication of data and information)
- Sharing global responsibility (shift to global cooperation, growing power of NGO's, increasing philanthropy)
Mega Trends are driving the future face of Manufacturing Industry through rapid transformations

Current State

- Capacity and Efficiency
- Make to Stock
- Disparate Plant Systems
- Historical Data Monitoring
- Supply chain

Future State

- Capability and Flexibility
- Make to Individual
- Convergence of OT and IT
- Real Time Dashboards
- Supply Circle
Objective:
- Sustainable manufacturing
- ICT-enabled intelligent manufacturing
- High performance manufacturing
- Higher Automation

A Transformation Framework leveraging
- OT and IT convergence
- Industrial Ethernet
- Mobile Applications
- Automation
- Big M Data Analytics
- Digital Modeling and Simulation
Factory of the Future – Definition & Vision

Factory of the Future is paradigm shifts from disconnected shop floor to connected manufacturing facilities by automating the flow of information through vertical integration “Shop Floor to the Top Floor” and horizontal integration across the plant site, locations etc.

1. Connected shop floor to Top Floor Systems (Business Systems 2 Way Integration)
2. Vertically and Horizontally Integrated systems, instruments & information
3. Support the internal customer (paradigm shift with demonstrable and sustainable benefits)
4. Real-time monitoring of machines, inventories and manual processes
5. Full shop floor visibility/transparency (all plants and processes)
6. RFID/Barcode’s/QR-Codes etc.
7. Smart Supply Chain Network
What do we mean by Smart Supply Chain, and do we all mean the same thing?

Visibility of:
- Product status
- Real time demand and demand plans
- Supply plans
- Inventory levels by location
- Orders

And visibility of assets e.g.:
- Vehicles, condition and capacity
- Production & Packaging equipment
- Loading- & Unloading system
- People and capabilities

If you can’t measure it, you can’t manage it!
How can it be so very difficult when we have the ability to use all these assets:

- Functional Excellence
- Horizontal Process Integration
- External Collaboration & Integration
- Smart Supply Chain

Our Point of View on the Progression of Supply Chain Management to a Smarter Future
Smarter Supply Chain

The Supply Chain of the Future must be SMARTER...It will be Instrumented, Interconnected & Intelligent

Automated Transactions & Smart Devices
- Use of sensors, actuators, RFID, & smart devices to automate transactions: inventory location, shelf-level replenishment detection, transportation locations & bottlenecks
- Supports real-time data collection & transparency from POS to manufacturing to raw material
- Sense-and-respond demand/supply signals allow “predict and act”

Optimized Flows
- Multi-Tier system integration across the network. Standardized data and processes.
- Collaborative decision making through decision support and business intelligence – starting with the customer
- Networked risk management programs for integrated financial controls with operational performance – monitored and measured

Networked Planning, Execution & Decision Analysis
- Simulation models to evaluate trade-offs of cost, time, quality, service and carbon and other criteria
- Probability-based risk assessment & predictive analysis
- Networked planning/execution with optimized forecasts & decision support
Case Study Cement Producer

Key Challenges in Cement Supply Chain
- No reflection of the real inventory situation
- Providing right information to the client about every dispatch
- Fleet Underutilization
- High Distribution Cost due frequent order changes or cancelations
- Waiting time to unload trucks due unavailable silos
- Manual order entry

Solution
- An end-to-end solution that addresses all aspects of the Cement Supply Chain Management
  - Automated Order Management
  - Real time stock measurement
  - Routing
  - Complete monitoring of the processes -- from loading of cement into the truck to delivery at customer site and return of the truck to the plant
- The OrbitLog VMI-solution provides real time stock & distribution information and integrates it within the ERP solution
- The Service oriented LOGistic System SoLOGS® for automated self service loading

Benefits
- Reduced Inventory Cost
- Reduced Delivery Cycle Time
- Elimination of truck waiting times
- Improved Plant Production Planning
- Optimizing routing and transportation times
- Reduced administration
- Cost reduction by approx. 20%
Case Study Oil Producer

Key Challenges in Oil/Gas Supply Chain
- No reflection of the real inventory situation at petrol stations
- Unstructured order timing
- Order volumes causing tankers to go out half full
- Peaks & troughs during the weak due consumer demand and price changes

Solution
- Integration between scheduling centers, terminals, trucks and customers assured robust planning and collaboration
  - Automated Order Management
  - Real time stock measurement
  - Routing
- The OrbitLog VMI-solution provides real time stock & distribution information and integrates it within the ERP solution

Benefits
- Petrol station Manager know when delivery will arrive
- Elimination of truck waiting times
- Optimizing routing and transportation times
- Schedulers can maximize the deliveries in a shift
- Reduced administration
The vision: Real time collaborative planning & forecasting

Collaborative network (customer / supplier / carrier)

- Real-time: orders + forecast + inventory + consumption + loading + movements

- Exception handling
- Customer order portal
- Order automation
- Proof of delivery

Always external connections

SAP HANA

SAP® S/4HANA
RALOG Supply Chain Engagement Methodology

**Discover**
*Conduct As-Is Analyzes*
- Understand As-Is process & capture current performance.
- Qualitative Analysis: Pain points and issues identification.
- Quantitative Data Analysis: (e.g. Product ABC based on revenue/gross margin/inventory)
- Process and Performance Analysis
- Process and Performance Gap Analysis
- Identify opportunity areas and Quick wins
- Value Identification and estimation

**Deep Dive**
*Definition To-Be Situation*
- Product/Customer Portfolio analysis
- Sales & Operations Planning
- Metrics Definition
  - Order To Cash Cycle Time
  - Return on Assets
  - Forecast Accuracy
  - Total Supply Chain Cost as % of Revenue
- High Level Road Map
  - To-Be Process Design
  - Timeline
  - Resource/Stafting
  - Cost/Benefit
- Identification of possible solutions

**Deployment**
*Definition To-Be Situation*
- Quick wins
  - Existing Process standardization and roll out, if needed
- Implementation
  - SCM Strategy
  - Organizational change
  - Solutions
- Project management
- Change Management
- Training
Thank you

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