Supply Chain Business Solutions driven by Advanced Analytics

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Changing Supply Chain Challenges

**Today’s Reality**
Margin is destroyed by: wrong product, wrong place, wrong time, poor quality, brand image....

**Today’s Reality**
Quality is what customers think it is. We no longer control our brand in this rapidly changing digital world.

**Today’s Reality**
Find the most profitable growth, take the best actions, maximize cross-business impact

**Today’s Reality**
Customer retention, upsell, cross sell, satisfaction, service revenue, social media, fraud, brand velocity....

**The New World**

**Customer Driven Quality**

**Balancing Demand and Supply**

**Customer Insights**

**After-Market Service**

**Data, data and more data**

**Today’s Reality**
Inside your company, outside your company, the real world, the virtual world....
SAS provides end to end business analytics ...
SAS® Analytics

- Data Visualization
- Statistics
- Data Mining
- Forecasting & Econometrics
- Quality Improvement
- Operations Research
- Text Analytics
- Model Management and Deployment
... and vertical solutions for specific business needs
**SAS Solution Categories**

### Demand Synchronization
Accurately calculating demand and balancing supply constraints is a top priority for executives within all manufacturing sectors.

Forecasting provides the basis for accurate statistical baseline forecasts and enables critical demand sensing and shaping capabilities.

Inventory optimization reduces the risk of stockouts and large inventory holding costs.

Sales and Operations Planning analytics allows organizations to optimally manage business constraints to optimize profits.

### Customer Driven Quality
Quality has emerged as a key topic for manufacturers. It is a key differentiator and has a major impact on the pricing and performance of any product in the market.

Predictive analytics provide the insight to what drives quality issues in a manufacturing process, as well as the assets used within the facility.

Social media analytics allow companies to understand if they are living up to their brand promise.

Powerful analytic algorithms monitor field events for the earliest indication of a quality problem.

### After-Market Service
Customer service is a critical function for every manufacturer. After-Market Service contributes 30% of the revenue and ~40% of all profits.

Predictive Analytics provides the foresight to anticipate service demand.

Predictive Analytics provides early warnings to product/usage issues.

The service chain is an integrated process, so too are the analytic inputs and outputs that drive better decision making.
DEMAND SYNCHRONIZATION
SAS® Demand-Driven Forecasting

- **Key Capabilities**
  - Automatically create statistical forecasts on a large scale
  - Model the effects of sales promotions, marketing events, and other external events

- **Features**
  - Automated forecast model selection
  - Complete model repository
  - What If analysis, Scenario Planning
  - Structured Consensus Planning
SAS® Forecasting for SAP APO

- **Key Capabilities**
  - Seamlessly integrate SAS’ superior forecasting with planning capabilities of the SAP Demand Planning module

- **Features**
  - Automated Forecast Model Selection
  - Complete Model Repository
  - Demand Sensing, Shaping
  - Event Modeling Console
  - What If Analysis, Scenario Planning
SAS® Inventory Optimization

- **Key Capabilities**
  - Optimize inventory replenishment policies and order quantities based on user-specified constraints

- **Features**
  - Multi-echelon Inventory Optimization
  - Replenishment Planning
  - Supply Shaping
  - What If Analysis
  - Scenario Planning
CUSTOMER DRIVEN QUALITY
SAS® Quality Lifecycle Analysis

- **Key capabilities**
  - Identifies anomalies in the production process that impact yield and product quality
  - Prioritizes problems based on business impact
  - Determines root cause more quickly

- **Features**
  - Provides automated reporting and alerting
  - Provides a collaborative environment
SAS® Predictive Asset Maintenance

- **Key capabilities**
  - Identifies equipment that is likely to fail and / or determines its remaining lifetime
  - Prioritizes problems based on business impact
  - Determines root cause more quickly

- **Features**
  - Provides automated reporting and alerting
  - Provides a collaborative environment
AFTER-MARKET SERVICE
SAS® Warranty Analysis

- **Key capabilities**
  - Early issue detection from field data
  - Problem prioritization
  - Problem identification and definition

- **Features**
  - Data integration
  - Warranty-specific predictive analytics
  - Integrated text analysis
  - Easy reporting capabilities
SAS® Service Parts Optimization

- **Key capabilities**
  - Reduce stockouts and overages with accurate forecasting
  - Optimize inventory replenishment policies and order quantities
  - Achieve targeted customer service levels

- **Features**
  - Robust, effective data management
  - Accurate forecasts at every level
  - Multi-echelon inventory optimization
  - Information sharing throughout the service chain
SAS® Suspect Claims Detection

- Key capabilities
  - Reduce service costs
  - Maximize effectiveness of auditors’ time
  - Improve service network effectiveness
  - Analyze and optimize parts usage
  - Short time to implementation

- Features
  - Scoring
  - Data and text mining with predictive models
  - Hosted solution - flexibility
  - IT and analytics expertise
SAS® Call Center and Planning Optimization

- Key capabilities
  - Service demand forecasting
  - Staff supply optimization
  - Root cause analysis
    - Demand, behavior, performance drivers
  - Analytic agent performance measurement
  - Actual to demand tracking alert

- Features
  - High powered predictive modeling
  - Revolutionary optimization methodology
  - Demand / supply planning integration
SUCCESS STORIES
<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity out of sync with Demand, resulting in shortages and excess.</td>
<td>SAS® Demand-Driven Forecasting</td>
<td>Sync capacity with demand for improved forecast accuracy to raise fill rate and reduce inventory</td>
</tr>
<tr>
<td>Monthly Forecast Frequency, limited Number of products and levels in the hierarchy</td>
<td>Accurately forecasts demand to facilitate optimized production capacity planning</td>
<td>Weekly Forecast frequency with Formal S&amp;OP process, increase planning and product hierarchies</td>
</tr>
<tr>
<td>100+ independent Spreadsheets</td>
<td></td>
<td>Reduce Spreadsheets and provide a secure database for planning</td>
</tr>
<tr>
<td>Limited department involvement in the forecasting process</td>
<td></td>
<td>Identify Emerging Trends and exceptions</td>
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<tr>
<td>Unable to identify Emerging Trends and Exceptions</td>
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**Challenge**

- Increase average revenue per car. Decrease the cost of transport.
- Better allocate resources, such as the number of cars, rail tracks, mechanics, and their locations along with helping sales target the best customers.
- Forecast error is too high, creating inefficiencies in planning and execution for operations, finance, marketing and sales.

**Solution**

- SAS® Demand-Driven Forecasting
  - Accurately forecasts the need / demand for transportation in order to optimally allocate resources such as rail cars, rail lines, mechanics, and other labor in their work force.

**Results**

- CP Rail can now identify who are the best customers to call on when a key index such as unemployment goes up.
- Reports now incorporate key economic indicators (price indices, unemployment, interest rates, and inflation) that are reflected in the demand for commodities they transport such as coal, wheat and fertilizers.
- Resource allocations are based on traffic volumes for transportation from origin to destination.
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| Poor forecasting models in SAP  
- Heavy bullwhip effects overstocked on slow movers  
- Under stocked on fast movers  
- No good alerts on stock outs or overstocked parts | SAS® Service Parts Optimization | Improved customer service  
- Improved inventory turns  
- Improved forecast accuracy  
“Our customers expect us to deliver parts overnight, weekend and in some cases within hours. It requires a very good transportation plan and a system that provides a good basis for planning and forecasting of inventory. The first thing we have. The logistics system we are now getting through SAS Institute.”  
Magne Svendsen  
Managing Director, After Sales Kverneland |
ConocoPhillips

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<td>Downtimes caused by defect assets on its oil drilling platforms in the North Sea caused hundreds of thousands $ in lost revenue</td>
<td>SAS® Predictive Asset Maintenance</td>
<td>Reduced unplanned shutdowns by 80%</td>
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<td>Maintenance costs were far too high</td>
<td>SAS® Performance Management</td>
<td>Increased production by 2 - 5%</td>
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<tr>
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<td>SAS® Enterprise BI Platform</td>
<td>Increased productivity by 20%</td>
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<td>SAS® Integrated Planning</td>
<td>Reduced Operating Costs 5 - 10%</td>
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<td>Realized a 590% ROI in year one</td>
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<td>$700 million operational savings over the following years</td>
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