Forecasting in SAP Integrated Business Planning
Webinar

SAP Development & Product Management
May 17th, 2018
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Agenda

❖ Forecasting Process in IBP - Overview and Best Practice
❖ System Demo & recent enhancements
❖ Roadmap and Future Direction
❖ Q&A*

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Plan and Respond with
SAP’s Integrated Business Planning Solution

Supply Chain Control Tower
Exception Handling and Business Network Collaboration

Sales & Operations
Strategic and Tactical Decision Processes

Demand
Statistical Forecasting, Consensus Planning & Demand Sensing

Inventory
Multi-Stage Inventory Optimization & DDMRP

Response & Supply
Allocations & Deployment Planning, Order Rescheduling
Unconstrained & Constrained Supply Planning

SAP HANA

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Forecasting Process in IBP - Overview and Best Practice
Full Value – A Streamlined Approach to Demand Planning
Cluster and Organize Your Demand Planning Process

Segmentation
- Quarterly/Yearly

Time Series Analysis
- Quarterly

Consensus Demand Planning
- Statistical Forecasting
  - Weekly/Monthly

Monitoring & Controlling of the Planning Process
- Process Step 1
- Process Step 2
- …
- Process Step n

Management by Exception
- Daily/Weekly

Forecast Accuracy Calculation
- Monthly

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Full Value – A Streamlined Approach to Demand Planning
Cluster and Organize Your Demand Planning Process

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## Demand Segmentation

Configure & Calculate Your Segments

<table>
<thead>
<tr>
<th>PRODUCT IMPORTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
</tbody>
</table>

<table>
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<th>PRODUCT VOLATILITY / FORECASTABILITY</th>
</tr>
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<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Z</td>
</tr>
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</table>

Define ABC and/or XYZ calculation rules
Example: Based on Revenue or QTYs?

Run segmentation jobs regularly
e.g. monthly or quarterly

Define planning strategies based on segmentation results
Demand Segmentation
Staffing Done Right: Focus Manpower on the Right Products

ABC Segmentation: Importance | XYZ Segmentation: Volatility / Forecastability

A-X
Very Important Products, but easy to Forecast

B-X
Medium Importance, easy to forecast

C-X
Low Importance, easy to forecast

A-Y
Very Important Products, not that easy to Forecast

B-Y
Medium Importance, not that easy to forecast

C-Y
Low Importance, not that easy to forecast

A-Z
Very Important Products, hard to forecast

B-Z
Medium Importance, hard to forecast

C-Z
Low Importance, hard to forecast
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  - Manual Input by Planners
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  - Quarterly/Yearly

Monitoring & Controlling of the Planning Process

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TIME SERIES – A SEQUENCE OF DATA

TIME SERIES ANALYSIS – EXAMINATION OF THE DATA

Identify demand properties like constant, seasonal, trend, sporadic etc. that are stored in an attribute.
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Statistical Forecasting
Preparation and Execution

Data Cleansing

Data Integration

Statistical Forecasting
Data Integration – Sales History

Master Data as well as Transactional Data can be integrated via the SAP Cloud Platform Integration Data Service to and from IBP.

- Pre-packaged content reduces TCO during implementation
- Core scenarios are covered as pre-packaged content that customers can flexibly adapt to their needs or add new ones

Example: Sales History is usually derived from the ERP Backend System

Other possible integration sources:
- S4
- APO
- BW
- SNC
- 3rd Parties
- …
Data Cleansing
Create Baseline Sales History as Foundation for a Good Statistical Forecast

Cleansed Data ➔ Reliable Data ➔ Better Forecasting Results

Substitute Missing Values
Outlier Correction
Promotion Sales Lift Elimination

Automated Data Cleansing
Define „pre-processing algorithms“ that automatically cleanse the data before the actual forecasting run

Manual Data Cleansing
Via Microsoft Excel, e.g. by calculating standard variations. The data can then be changed directly in the planning view

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Forecast Automation
Time Series Analysis as one important contributor

Ultimate Business Goal:
Achieve a highly automated forecasting functionality that produces robust forecast with high quality as user knowledge and time is limited.

The Road to Automation:

Forecast Level Optimization
- Determine the best level of forecast execution for each time series in combination with corresponding disaggregation logic (future direction)

Understand the Data: Time Series Analysis
- Identify the patterns in each individual time series like constant, trend, seasonal (planned for SAPIBP 1808)
- Identify product lifecycle like discontinued, growth, maturity, decline phase (future direction)
- Find anomalies in the time series data like level or trend change (planned for SAPIBP 1902)
- ...

Treat the data as learned: Select optimal forecast algorithm and parameters
- Best-Fit Model (available)
- Automated parameter optimization (partly available)
- Additional forecasting algorithms (ongoing process)
Statistical Forecasting Models

Data Cleansing
• Outlier Correction
• Substitute Missing Values
• Promotion Sales Lift Elimination

Constant Models
• Automated Exponential Smoothing
• Single Exponential Smoothing
• Adaptive-Response-Rate Single Exponential Smoothing
• Simple Moving Average
• Simple Average
• Weighted Moving Average
• Weighted Average
• Auto-ARIMA

Trend Models
• Automated Exponential Smoothing
• Double Exponential Smoothing
• Brown’s Linear Exponential Smoothing
• Auto-ARIMA

Seasonal Models
• Automated Exponential Smoothing
• Triple Exponential Smoothing
• Auto-SARIMA

Sporadic Demand Models
• Croston Method

Regression Models
• Multiple Linear Regression
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Process Step 1 ➔ Process Step 2 ➔ … ➔ Process Step n

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Manual Input & Refinement by Planners, Example

Take the Reigns: Refine an Automated Process

Example:

- Statistical Forecast
- Manual Sales Input
- Manual Marketing Input
- Manual Demand Planner Input
- Final Consensus Demand Plan
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Forecast Accuracy Calculation
Measure the Quality of the Forecasting Process

What it Does:

**Accuracy Analysis**
- Compares the different forecasts with the historical sales

**Bias Analysis**
- Compares forecast tendencies to historic sales trend

**Value Add Analysis**
- Measures quality of different forecasting steps

What it Means:

- Identify Areas With Planning Issues
- Improve Forecast Accuracy One Level at a Time
- Identify trends over time
- Identify Areas Suitable for Automation

Short Term Improvements

Long Term Improvements
Forecast Accuracy Calculation: Value Add

Compare Forecast Accuracy & Bias

Which LoB provides the best forecast?

Are there country, product group or planner specific differences in the value add?

Which LoB provides value to the statistical forecast?

Which planning steps can be removed?

…
Forecast Accuracy Value Add: Example Analytics

**Forecast Accuracy (%) Value Add: Lag = 3, last 3 Months**

- 1 - Statistical: 52.3
- 2 - Sales: 8.0
- 3 - Demand: 8.0
- 4 - Consensus: 82.0

**A Segment: Forecast Value Add by XYZ (last 3 Months, Lag 1)**

- X: 54.67, 54.64, 54.96
- Y: 54.26, 55.17
- Z: 53.75

**Forecast Value Add by Demand Pattern (last 3 Months, Lag 1)**

- Seasonal
- Seasonal Trend
- Sporadic
- Trend

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Management by Exception*
Define Alerts and Manage Resolution

**ALERTS**

- Forecast Bias on product level above threshold
- Forecast Accuracy on product group level below target
- Planned Promotion Uplift is bigger than 50% of baseline demand
- ...

**Case Management**

- Specify what steps for correction are needed
- Specify person/people responsible
- Specify deadline to implement corrections

- NA Sales Team Update
- APJ Sales Team Update
- Global Demand Planner Update
- Case Solved

* Additional licensing may apply
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Monitor & Control the Planning Process

Process Management*

Setup & Define the Process:
- Define process steps
- Assign involved/responsible people
- Define timelines per step
- Enable/disable data input per step
- Define automated processes at the beginning/end of a process step

Monitor & Control the Process:
- What is the current status?
- Where are everybody situated on their given timelines?
- Are there any delays in the process? If so, what or who is delayed?
- Can we start the next process step?
- ...

View one or multiple processes in a Gantt Chart view

* Process Management requires “SAP Integrated Business Planning for sales and operations” subscription
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... What is the next steps to tackle growing market volatility
Demand Sensing
Demand Sensing – Next Level of Forecasting
Create a Short Term Forecast by Reacting on current Demand Signals

**Traditional Forecasting**
- Time Horizon: 12-18 Months
- Granularity: Weeks or Months

**Demand Sensing**
- Time Horizon: 4-8 Weeks
- Granularity: Days

Short Term “internal” Demand Signals like Deliveries, Sales Orders and Promotions

Short Term “external” Demand Signals like PoS or Weather* data

* Future Direction
Demand Sensing: Key Capabilities & Benefits

• Demand Sensing creates short term forecast:
  • 4-8 weeks forecast in daily granularity
  • Fully automated
  • Using pattern recognition
  • Leveraging multiple demand signals

• Improved short term forecast:
  • Drives right deployment and transportation decisions, which leads to reduced stock outs and less rush orders
  • Leads to lower safety stock due to higher forecast accuracy (if run together with IBP for inventory)
  • Leads to lower cycle stock due to improved forecast bias
  • Improves the service level
  • Frees up planner’s capacity due to fully automated process
  • Depending on lead times and reaction time: improved production, packaging and material purchasing
Further Capabilities in IBP for Demand
Further Capabilities in Demand Planning

- Manage Product Lifecycle
- Trade Promotions
- Realignment
- Customer Collaboration
- Excel Planning Interface
- E2E Business Process
- Flexible Planning Levels
- Machine Learning
Further Capabilities in Demand Planning

MANAGE PRODUCT LIFECYCLE

TRADE PROMOTIONS

REALIGMENT

CUSTOMER COLLABORATION

EXCEL PLANNING INTERFACE

E2E BUSINESS PROCESS

FLEXIBLE PLANNING LEVELS

MACHINE LEARNING
Managing Product Lifecycle

Improve Forecasting Accuracy Both for New and Obsolete Products

- Forecasting during product replacements and introduction of new products
- Generate a reliable forecast for new products without sales history
- Generate a reliable forecast for products during phase-out period
Manage Global Product Launch

Example

Phase-In: July 2018
Phase-Out: April 2022

Phase-In: September 2018
Phase-Out: July 2022

Phase-In: September 2018
Phase-Out: July 2023

Phase-In: July 2018
Phase-Out: April 2025

Phase-In: December 2018
Phase-Out: May 2026
Further Capabilities in Demand Planning

- Manage Product Lifecycle
- Trade Promotions
- Realignment
- Customer Collaboration
- Excel Planning Interface
- E2E Business Process
- Flexible Planning Levels
- Machine Learning
Trade Promotions
How to Integrate Promotions in the Planning Process

Option 1: Load Promotions from external system into SAP IBP

Trade Promotion Management in SAP CRM, Microsoft Excel, Other

Promotions Plan

Upload via…

HANA CPI-DS .csv File

SAP IBP

Option 2: Create Promotions in SAP IBP

SAP IBP

Demand Planner

Analyze Promotions

Create

Promotions Plan
Trade Promotions in SAP IBP

Capabilities:

- Provide Overview as well as Details of Trade Promotions
- Bridge the gap of having different planning levels in Sales and Supply Chain
- Create and adjust promotions on level of location, product, customer or period

Benefits:

- Improved forecast accuracy by incorporating trade promotions in the planning process
- More efficient trade promotions handling by fully automated integration into IBP
- Improved collaboration between Sales and Demand Planners
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Product Roadmap
# SAP Integrated Business Planning for demand

## Product road map overview – key themes and capabilities

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<tr>
<th>V1805 – Recent innovations</th>
<th>V1808 – Planned Q3/2018¹</th>
<th>V1811 – Planned Q4/2018¹</th>
<th>V1902 – Planned Q2/2019¹</th>
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<tr>
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<td>▪ Improved Croston forecast algorithm</td>
<td>▪ Data realignment</td>
<td>▪ New forecast algorithm:</td>
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</tr>
<tr>
<td>▪ Enhanced promotion creation</td>
<td>▪ Time-series analysis</td>
<td>– Gradient boosting</td>
<td>– Naïve algorithms</td>
</tr>
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<td>▪ Improved daily disaggregation</td>
<td>▪ Segmentation: Improved logic for XYZ calculation</td>
<td>▪ Product lifecycle management/like modeling: Configure product lifecycle</td>
<td>▪ Forecast automation: Anomaly detection</td>
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## Demand sensing

### Recent innovations
- Improved Croston forecast algorithm
- Enhanced promotion creation

### Planned Q3/2018
- Data realignment
- Time-series analysis
- Segmentation: Improved logic for XYZ calculation

### Planned Q4/2018
- New forecast algorithm:
  - Gradient boosting
- Product lifecycle management/like modeling: Configure product lifecycle

### Planned Q2/2019
- New forecast algorithm:
  - Naïve algorithms
- Forecast automation: Anomaly detection

### Support more than one downstream signal

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**Release 1805**

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SAP Integrated Business Planning for demand
Direction update

- Forecast automation enhancements
- Forecasting enhancement, including new advanced algorithms (such as Auto-ARIMAX)
- Assumption-based forecasting
- Aggregated lifecycle planning
- Usage of additional external data sources (such as weather or social sentiments) in demand sensing
- Use of group seasonality in stat forecasting (aggregated seasonality applied to lower-level items)
- Market- and customer-driven enhancements, and extended industry support

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Thank you.

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