Creating Global Transparency with ONE Global Demand Planning Concept
Arla in Brief
Who are we and what do we do

- 12,000+ OWNERS
- 14+ BL. KG. MILK INTAKE
- THE 4TH LARGEST
- 19,000+ COLLEAGUES
- 10+ BL. EURO REVENUE
- 3 BRANDS

Demand Planning at Arla, Benny Christensen
From cow to consumer:
Arla Foods has a quite complex and broad value chain, and planning and forecasting is therefore very important to us.

- Milk collection and planning
- Processing and production
- Outbound logistics and Trading sales
- Sales and Marketing
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Who: Arla Foods as a Logistical Entity

Where: The Supply Chain Journey that went Before with SAP APO

Why and What: Creating a Global Overview in Demand Planning

Beyond: Moving on with IBP Demand Sensing

Wrap up and Questions
Its been a long road with APO
Leg 1, 2001-2008: Functionality and a baseline

• We started considering APO in 2001 going live with Demand Planning in 2003

• Followed by Production Planning and subsequently Detailed Scheduling in 2004

• After this was a long series of roll outs

• In 2008 we added Replenishment planning and the baseline was made to start the S&OP journey
Its been a long road with APO
Leg 2, 2008-2013: S&OP – the eyeopener

• From 2008 we started to focus on S&OP, Pulling it all together.

• Working with S&OP secured that we have a Structured, Long term and Hollistic planning approach

• Subsequently generating the need for even better data foundation e.g. long range forecast
Its been a long road with APO
Leg 3, 2013+: Consolidation, simplification and standardization

• As a logical consequence of organic growth and mergers our business processes and IT landscapes differs quite a lot. This needs to change and the “one Planning & Allocation” project was established.
  • ONE, Demand Planning solution (Roll out ”complete”)
  • ONE, Master Production Planning solution (Roll out in progress)
  • Rework and standardisation of Site level scheduling (Project initiation)
Planning in Arla Foods across the value chain
DP is the main cogwheel that drives the change

Sales & Operations Planning

**Business Planning**
- Horizon: 0 - 6M - 1y - 1.5y - 3y
- Main stakeholders: Business Development, Sales
- Focus: Category, Markets
- Primary output: Business Plan

**Demand Planning**
- Horizon: 0 - 6M - 1y - 1.5y - 3y
- Focus: Sales Global Planning
- Primary output: Unconstrained Sales Forecast

**Master Production Planning**
- Horizon: 0 - 6M - 1y - 1.5y - 3y
- Focus: Supply Chain Global Production
- Primary output: Capacity Balanced Master Production Plan

**Replenishment Planning**
- Horizon: 0 - 6M - 1y - 1.5y - 3y
- Focus: Supply Chain Logistics
- Primary output: Replenishment Plan to warehouses

**Site planning**
- Focus: Production
- Primary output: Detailed scheduled production plan

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**Primary output**

**Focus**

**Horizon**

**Main stakeholders**

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**Demand Planning at Arla, Benny Christensen**

April 2017
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Wrap up and Questions
The purpose of the demand planning processes in Arla is to continuously create the **best unbiased guess on the future demand for the various products**.

This one set of forecast numbers are **applied throughout the supply chain** and are used for reserving machine and labour capacity in the dairies, ensuring sufficient supplies of packaging and ingredients, and optimizing milk allocation.

**Milk Planning**: Do we have enough milk of the right types (e.g. Organic vs. conventional) according to the forecasts?

**Capex**: Create Capex request if existing capacity is insufficient to cover demand.

**Global procurement**: Negotiating prices of packaging material based on forecast.

**Supply Chain**: Securing the capacity on the different packaging lines, filling lines and warehouses.

**S&OP**: Balancing prioritization of customer demand versus supply capability.
Arla Demand Sensing
Process game board

Long Term Demand Planning

START
- Assign Forecast Model
- Maintain seasonality
- Maintain promotion splits
- Maintain DFP for NPDs
- Maintain Location splits
- Sales history cleaning
- Adjust LT basic forecast
- LT & OP Forecast ready
- Synchronize to ST

Demand Sensing

- Calculate sensing run
- Load Open Orders & Deliveries
- Load promotions
- Consensus Demand
- Exclude Holiday weeks
- Prioritize Sensed Demand
- Maintain DFP logsics

Short term demand planning

- Sensed Demand updated in APO
- Synchronize to LT
- Load to BW
- Review Sensed Demand alerts
- Adjust for delivery issues
- Manual ST adjustments
- Feedback to LT DP on step changes
- Review DS forecast accuracy
- Release ST forecast
- Feedback to ST DP on DFP changes

Replenishment planning

END
Planning levels
Input and review of demand plans can be done from multiple angles.

Statistical forecast is calculated on Product / Plan Customer level.

The product forecast is disaggregated to locations.

Strategic adjustments can be maintained on total category level.

In order to sort and filter data in the demand plan, master data parameters such as Sales Organization, Profit Center, Sales Responsible, Category hierarchy, and Material Group can be used.
Forecast horizon
Horizons and granularity of forecast are based on business needs

- Due to planning of seasons, the short term demand planning horizon is 26 weeks. Short lead times, short shelf life and need for optimizing capacity, requires the short term demand planning to be done in daily buckets.
- Long term planning horizon is 104 weeks (2 year) and for long maturation time-products the horizon is 156 weeks (3 years).

The split between long term and short term demand planning horizon can be adjusted to fit the product.

- Due to long order lead times the forecasting only takes place in weekly buckets in a 16 month horizon.
Unconstrained forecast is built upon adjustments to the baseline

The final forecast (Unconstrained forecast) is a build-up from a series of adjustments to the basic forecast.

- S&OP input, Other strategic sources (i.e. marketing)
- Promotion-related input from Sales, from SalgInfo
- Baseline forecast from cleaned history
- Demand Planner knowledge

Note: can be overwritten by planner forecast

All adjustments are traceable to user, time and number entered.

Volume

Basic Forecast

Promotion Adjustment

Planner Adjustment

Strategic Adjustment

Unconstrained Forecast

Unconstrained Forecast =

Demand Planning at Arla, Benny Christensen
Baseline: Statistical forecast
Forecast is based on a statistical baseline forecast with step changes, seasonality, and promotions on top.

In order to calculate a statistical baseline forecast for the future, we need to know the baseline sales of the past.

Thus, in order to estimate baseline sales of the past, all uplifts, promotions and obscure order history not expected to be repeated, must be cleaned out from the sales history.
Cleaning
As a step 1, automatic cleaning is done on promotions

• Past weeks with promotions are automatically cleaned down to the basic statistical forecast.
Cleaning
As a step 2, ‘Exclude week’ indicators makes it simple and easy to clean outliers.

Manual cleaning

- Weeks with outliers, due to e.g. exceptional sales or stock outs are cleaned manually by marking the week as an “Exclude week”.
- The marked exclude weeks are cleaned down to the basic statistical forecast – similar to the automatic cleaning logic.
- Exclusion of weeks can be done on aggregated level, e.g. across product groups or customers.
**Seasonality**

Seasonality index is maintained on group level and applied on baseline forecast.

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**Purpose**

Seasonality index can be added on top of the statistical baseline forecast for products applying a constant seasonal model.

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**Seasonal patterns**

The strengths of using the seasonal pattern are:

- Use several products with the same seasonality, making outliers less significant
- The product doesn’t need 52 weeks to create seasonality
- Using the constant model as the statistical model, keeps the forecast up to speed, but seasonal pattern is still taken into account
Reaction to step changes (and trends) is always an issue in statistical forecasting

- Actual changes in the demand pattern (not noise) disrupts the statistical forecast
- As statistical forecasts are calculated on basis of historical events, they are always reactive, no matter how much emphasis, there is on most recent data points

Constant forecast takes time to “catch” up to proper level

This is even though there is a trend-recognizing model assigned
The Step change functionality enables the planner to adjust the basic forecast in a simple and transparent way, making input easier to incorporate in forecast.

- Proactively changing the forecast
- Getting the history up to speed faster
- Possible to use both in past and future

**Purpose**

**Step changes in the past**

**Step change in the future**

**Trend with step change**

- Basic forecast
- History
- Step Change

- Basic forecast
- History
- Step Change

**Step changes in the past**

- Basic forecast
- History
- Step Change

**Step change in the future**

- Basic forecast
- History
- Step Change
Statistical Forecast Made Simple ...

**Constant**
- New product?
  - Yes: Constant forecast, for setting the level. Only two models required.
  - No: Stat. Fcst?
    - Yes: Constant SES a 0,2
    - No: Manual forecast

**Seasonality**
- Seasonality expected?
  - Yes: No index applied
  - No: Create own seasonality profile
    - Any standard index sufficient?
      - Yes: Apply seasonal index
      - No: Trend / step change expected?
        - Yes: Add step change / trend
        - No: Leave as-is
Alerts
A bold palette of alerts are offered to make the life of the demand planner easier
Benefit case – Going global on ONE SAP APO DP
Demand planning lays the foundation for harvesting supply chain benefits

• Hard Benefits
  • We were at a very good level 80-90% accuracy, but we became even better
  • We had several measures improved (MAPE, BIAS etc)
  • The first results, were so good, that no one believed it to be true – but it has been the same since
  • This has impacted
    • Scrap (Shelf life)
    • Safety stock

• Soft Benefits
  • Drive best practise and performance improvement
  • Share resource across core markets to ensure efficient use of resource
  • Increased focus on long term forecast to drive the right S&OP decisions and forecast improvements
  • Aligning ways of working e.g. Finance weekly pulse report, S&OP, Risk and Opportunities and logistics
  • Single point of contact for APO template development
Arla is moving on with Demand Sensing

Why?
The purpose of Demand Sensing is to create a **short term forecast** with **high forecast accuracy** based on advanced regression algorithms and latest demand input from sales orders.

What?

Weekly consensus demand

Sales Orders

Shipments

POS

Promotions

Other intelligence...

Daily sensed demand

When?

You need to make decisions on a short term horizon, e.g. due to demand variations, short shelf life or replenishment to many stocking points.

The short term demand is influenced by a range of parameters such as weather, campaigns and cannibalization, competitor activities, micro trends etc.

What do you get?

Higher customer service level + Lower inventory costs

Demand Planning at Arla, Benny Christensen
What tool did we choose: SAP-IBP Demand Sensing

And Implement Consultant Group was chosen as our implementation partner.
• Established in 1996
• Market leader in Scandinavia within creating change with impact
• Today, 550 employees of which 500+ are consultants
• Servicing private and public companies in Europe from offices in Copenhagen, Zürich, Stockholm, Malmo, Bergen, Oslo and Helsinki
ICG contains an extensive competence pool, balanced across different business areas and IBP tools.

**ICG Competences**

- Business Process Knowledge
- Technical insights
- IBP Experience

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**IBP Consultants - Implementation, Proof of Concept and Trainers**

- **Preferred IBP instructors for SAP across Europe:**
  - SAP DE / Walldorf: 5 courses
  - SAP Netherlands: 4 courses
  - SAP Belgium: 5 courses
  - SAP UK: 2 courses
  - SAP CH: 2 courses
  - Customer Specific Training: 4
  - + 70 courses planned for 2017

- **IBP Implementation Experience:**
  - IBP S&OP: 4 month project already live
  - IBP S&OP: Delivered multiple proof of concepts in 3 months
  - IBP S&OP: Proof of Concept in 2½ months (Ongoing)
  - IBP Demand Sensing: Go-live 2nd quarter '17 in collaboration with SAP DE

- **IBP Service Lines with Special Focus Areas Supporting the IBP Evolution**
  - IBP S&OP / Supply: Service Line Members: 9
  - IBP Inventory: Service Line Members: 8
  - IBP Demand: Service Line Members: 7

- **Hana Cloud Integration**
  (package solutions for MD integration)
  - A team of 3 consultants specialized in IBP integration

- **IBP Front End/Excel Configuration**
  - A team of 3 consultants specialized in IBP Frontend configuration
Demand Planning vs Demand Sensing

**Demand Planning**

- **Objective**: Create a reliable long term sales forecast for S&OP and master production planning.

- **Horizon**: 6 weeks to 2 years

- **KPI**: Forecast Accuracy (1 M lag, weekly buckets)

- **Tools**: SAP APO DP

**Demand Sensing**

- **Objective**: Create a reliable short term forecast on daily level for replenishment, production and distribution planning.

- **Horizon**: 0-6 weeks

- **KPI**: Delivery accuracy

- **Tools**: SAP APO DP, SAP APO Demand Sensing, SAP APO SNP

Create good forecasts to supply chain
SAP IBP Demand Sensing

IBP DP Demand Sensing

1. Calculate new weekly consensus demand and split it to daily buckets
2. Add promotions on top

- Weekly Full Sensing run
- Daily Update runs

Basic Forecast + Planner Adjustment + Strategic Adjustment
Weekly Consensus Demand w/o promotions
Daily Promotions

Sensed Demand
Daily, incl promotions

Historical Sales Orders with req. qty and del. qty
Future Sales Orders (req.qty)

Demand Planning at Arla, Benny Christensen
April 2017
SAP IBP Demand Sensing
Weekly Full Sensing run vs Daily Update run

**Weekly Full Sensing run**

- Runs once a week (early Monday morning)
- Takes into account latest Weekly Consensus demand w/o promotions.
- Calculates profile weights.
- May update weekly Sensed Demand volume, based on e.g. Open Orders.

**Daily Update run**

- Runs daily (likely in the early morning, based on whenever the orders are received)
- Recalculated profile weights based on latest open orders and deliveries.
- Does not change total weekly Sensed Demand volume, unless total Open Orders exceed weekly Sensed Demand.
Sensed Demand will be available in Short term Planning Book
Logic for how Sensed Demand should take priority against Unconstrained Forecast is to be defined.

IBP DP Demand Sensing

1. Calculate new weekly consensus demand and split it to daily buckets
2. Add promotions on top

Sensed Demand
Challenges in moving towards a sensed demand

- Seasonal trends/Temperature dependencies – very hard to automate without taking in external data
- Lumpy demand because of full pallet orders.
- Events (Seasonal holidays, Cruiseships, festivals etc.)
- High stock levels to secure delivery accuracy → Unexplained demand patterns
- Many promotions / Changed sales after promotion.
- Unknown stock quantities at customers DC.
- Some products with long lead time (3-6 weeks) and only weekly production. Risk of step changes.
Demand Sensing, but what will it give us
The following benefits of Demand Sensing have been identified

**Summary of expected benefits**

- Reduced scrap
- Less time spent on short term forecasting
- Improve delivery service

**Preconditions:**

- SAP must improve daily Demand Sensing run logic.
- Long term forecast models must adhere to PAC Demand Planning best practice.

**Future**

- Next IBP releases should improve the daily run

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<th>Food Service</th>
<th>Yoghurt etc.</th>
<th>Cheese</th>
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<td>Some</td>
<td></td>
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<td><strong>Improve delivery service</strong></td>
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<tr>
<td><strong>Freed up time</strong></td>
<td>A lot!</td>
<td>Some</td>
<td>Some</td>
<td>Some</td>
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</tr>
</tbody>
</table>
Learnings
Running our first IBP project

• Platform considerations
  • Support setup, needs to be considered when moving to new platform
  • Interfaces are always problematic no matter how smooth they run – they can break
  • Cloud – which is a whole new dogma

Succes Factors
• Business project with IT - or no project
• Remember this is not just an IBP project, this is as much APO – Demand Planning.
• You get what you give, you need to have a quality baseline forecast
• Problems can be complicated, but complex solutions even more so...

The upside
• POC – well defined process – real data, live result
• SAP and ICG has really shown they want a success with us
  • First mover together with sap
  • ICG the guys that have the road miles on this, and could cut through complexity
Final Thoughts on IBP and IBP Demand Sensing

• This will revolutionize the way we work with forecast
• Much more focus on the long term forecast
• Much better foundation for S&OP
• In short a new supply chain foundation, taking us to a new level!
• IBP is the future for us, and IBP DS is the first step on a looong journey 😊
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Questions?