Demand Planner

Sales & Operations Planning Applications
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Product Hierarchy

Agenda

Demand Planning
- Demand Planner
- SQL Server Analysis Services (OLAP)

Supply Planning
- Excel
- Microsoft Dynamics AX 4.1 (next release)
Forecasting Process Improvement

- Sum of deviation = 25
- Sum of deviation = 0

Forecast process improvement

- Remove Bias
- Reduce variation
- Focus on collaboration
- Accept and record variation

Supply Planning Tools

- MRP
  - Operates directly on master data
  - No attempt at optimization
- Excel
  - Simple to use and understand
  - Quick feedback
  - No attempt at optimization
- Advanced planning solutions
  - Complicated
  - Require lots of data
  - Slow
  - Tries to optimize

Excel Planning
Is the process under control?

- Deviation from plan

Use Control Limits

Limits can be calculated in various ways. Typically 3 standard deviations is used.

Data quality

ERP Master Data are noisy
- Missing information
- Outdated information
- Data entry errors

Use as few data as possible

Prefer data critical for day-to-day operation

Something special happened here

This is within the variation of the process

What happened here?
**Quality of Service**

**Example**
- Fulfill 98% of all customer orders for Mountain Bikes on time

**Strategies**
- Short lead time on Mountain Bikes
- Keep safety stock

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**Safety Stock and quality of service**

- Use variation from forecast to determine amount needed to have 98% probability that demand is below this amount

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**Model Construction**

**Potential bottlenecks only**
- Reduces model complexity and data requirements

**Basic LP formulation of mass balance**

**Quality of Service constraint**
- Takes forecast variance into account

**Throughput constraint**
- Takes production variation into account

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**Theory of Constraints**

- Exactly one bottleneck
- The bottleneck dictates the overall throughput
- All other processes can by definition sustain the bottleneck throughput
- Make sure bottleneck does not starve
- Bottleneck may change when mix changes
Throughput function

**GOAL Based Optimization** gives Charlie (CEO) the ability to prioritize these strategies during planning.

**Cost accounting**

- **Mountain Bike**
  - Material 60 $
  - Labour 200 $
  - Sales Price 360 $
  - Profit 100$

- **City Bike**
  - Material 60$
  - Labour 100 $
  - Sales price 220$
  - Profit 60$

**Advantages**

- More realistic plan
- Less WIP accumulated
- Fewer rush orders

**Labour hours are the bottleneck**

We can produce 2 City bikes or 1 Mountain Bike

Profit is 120 $ for 2 City Bikes !

**Planning Strategies**

- Chase Demand
- Level Production
- Maximize Profit
- Cash Flow
- Minimize Inventory

**Throughput Function**

- Establish relationship between WIP and throughput
- Identify variation

**Analyses actual production data**

**Create LP approximation**

**MRP assumption**

- Throughput = WIP, WIP<MaxCapacity
- Throughput = MaxCapacity, WIP>=MaxCapacity

**Problems**

- WIP accumulates
- Lead time increases
- Rush orders
- Plans never work