Inventory Forecasting

Art?

Science?

Crystal Ball?

or ............?

Presented by:

George J. Mollo, Jr.
GJM Associates
NCOF, May 2001
Topics to be Covered

• At least 10 factors to be considered when forecasting
• Several methods of forecasting
• Ways to forecast new items and repeat items
• How to improve inventory coverage to achieve maximum fill rates
• Profitability considerations
• Ways to simplify the process

© 2001, George J. Mollo, Jr.
Inventory Forecasting

Art?

Science?

Crystal Ball?

or ............?

UNDERSTANDING RELATIONSHIPS !!

© 2001, George J. Mollo, Jr.
How Do We Improve “Forecasting” Accuracy?
Simple & General Approach

• Improve majority of items - Don’t try for 100% accuracy on all items
  “ALMOST” Right NOW is better than...
  “EXACTLY” Right Later!

• Reduce exceptions
• Take Small steps
Planning

- Formal Planning Process
- Historical Analysis
- 6-12+ months in advance
- Assortment Plans (Category, etc.)
- Category/Sub-Cat Relationships
Planning

- Item Counts (based on pages/density)
- New vs. Repeat Item relationships
- Space Allocation
- Margin Targets & Price Points
- Average Price Offered vs. Sold
- Vendor Performance History
- Estimated Item Profitability
Communication (Pre & In Season)

• Marketing (demand by drop, list information, target audience, etc.)
• Merchandising (market, competition, styles, etc.)
• Creative (Coordinate presentation to audience, availability, add/drop items)
• Internal Relationships - Between Departments
It’s All in RELATIONSHIPS!

• How Many Use These Measures – Yet Independent of Each Other??
  • Category Share
  • Item Count
  • Page Space
  • Demand (Book & Item)
  • Page or Spread Average
  • Etc......
### Forecasting Factors

- Presentation (Size)
- Creative Factors
- Location in Catalog (key positions)
- Competition (Internal & External)
- Demand History
- Price Points
- Circulation (Qty/Target)
- Item Counts (Density)
- Space
- Space Costs (Sell Ratio)
- Item Relationships (Ranking A - B - C)
- Seasonality
- Indices
Methods of Forecasting

- Units
  - Who’s unit forecast number?
- Dollars
  - Forecast to dollars, buy to units
  - $ per k circ **
- AII (Average Item Index)
- Forecasts “tied out” – Top Down AND Bottoms Up
Methods of Forecasting

• Other “Tools” - or “Simple Checks”
  • Productivity Index (Category)
  • Space Index (Category)
  • Ad to Sales Ratio (Sell Ratio)
  • Page Average
  • Top Item Forecast vs. Bottom Item Forecast Relationship (within a dept.)
$ per 1000 Circulated

(Projected item $$ demand / circulation (k))

- Example: Item A Projected $23,000 demand / circulation 3.5mil)
  - $23000 ÷ 3500 = $6.57 per 1000 circ.

** Caveat
$ per 1000 Circulated

- **Advantage**: Consistent Item Comparison Base *within* same drop/catalog

- **Disadvantage**: Inconsistent Item Comparison Base *between* drops/catalogs
  - Marketing changes to “productivity” must be considered

© 2001, George J. Mollo, Jr.
AII (Average Item Index)

\[
\text{AII} = \frac{\text{Projected Item } $$$ \text{ Demand}}{\text{(Projected } $$$ \text{ demand in Offer/Number of items)}}
\]
AII (Average Item Index)

Projected Catalog Demand: $5,000.0

Total # of Items: 250

Average Item: $20,000

Item A = $ 30,000  1.5
Item B = $ 20,000  1.0
Item C = $ 14,000  0.7
AII (Average Item Index)

- **Advantage**: Consistent Item Comparison Base **within** same drop/catalog
- **Advantage**: Consistent Item Comparison Base **between/across** drops/catalogs
- **Advantage**: When forecast changes – Index doesn’t change, only value does
- **Demonstrates Relationships** (To Overall Average & Other Items)
AII (Average Item Index)

- **Disadvantage**: Space must be factored (full page, cover vs. average)
- **Disadvantage**: Seasonality must be factored

*However, Space and Seasonality changes are easy to identify*
<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>drop 1</th>
<th>drop 2</th>
<th>drop 3</th>
<th>drop 4</th>
<th>drop 5</th>
<th>drop 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item A</td>
<td>l/s shirt</td>
<td>2.0</td>
<td>1.8</td>
<td>1.6</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item B</td>
<td>s/s shirt</td>
<td>0.4</td>
<td>1.4</td>
<td>2.0</td>
<td>5.0</td>
<td>2.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Item C</td>
<td>plaid shirt</td>
<td>1.0</td>
<td>0.8</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item D</td>
<td>henley shirt</td>
<td>0.9</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Item E</td>
<td>pique polo</td>
<td>2.0</td>
<td>2.0</td>
<td>2.2</td>
<td>2.1</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Item F</td>
<td>interlock polo</td>
<td>2.0</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

© 2001, George J. Mollo, Jr.
<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>drop 1</th>
<th>drop 2</th>
<th>drop 3</th>
<th>drop 4</th>
<th>drop 5</th>
<th>drop 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item A</td>
<td>l/s shirt</td>
<td>2.0</td>
<td>1.8</td>
<td>1.6</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item B</td>
<td>s/s shirt</td>
<td>0.4</td>
<td>1.4</td>
<td>2.0</td>
<td>5.0</td>
<td>2.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Item C</td>
<td>plaid shirt</td>
<td>1.0</td>
<td>0.8</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item D</td>
<td>henley shirt</td>
<td>0.9</td>
<td>1.0</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item E</td>
<td>pique polo</td>
<td>2.0</td>
<td>2.0</td>
<td>2.2</td>
<td>2.1</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Item F</td>
<td>interlock polo</td>
<td>2.0</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

© 2001, George J. Mollo, Jr.
Other Measures/Indices
(Trends/Profitability Indicators)

- Performance Index (Category AII)
- Category Space Index
- Sell Ratio

© 2001, George J. Mollo, Jr.
Performance Index:
(% of demand / % of items)
(a.k.a. - Category AII)
<table>
<thead>
<tr>
<th>Description</th>
<th>This</th>
<th>Year</th>
<th>This</th>
<th>Year</th>
<th>TY Avg.</th>
<th>TY Perf.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Items</td>
<td>%</td>
<td>Demand</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring 99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL DROP:</td>
<td>218</td>
<td>100.0%</td>
<td>5500.0</td>
<td>100.0%</td>
<td>25,229</td>
<td>1.00</td>
</tr>
<tr>
<td>GIFTS</td>
<td>43</td>
<td>19.7%</td>
<td>1204.5</td>
<td>21.9%</td>
<td>28,012</td>
<td>1.11</td>
</tr>
<tr>
<td>HOME</td>
<td>54</td>
<td>24.8%</td>
<td>1353.0</td>
<td>24.6%</td>
<td>25,056</td>
<td>0.99</td>
</tr>
<tr>
<td>APPAREL</td>
<td>50</td>
<td>22.9%</td>
<td>1743.5</td>
<td>31.7%</td>
<td>34,870</td>
<td>1.38</td>
</tr>
<tr>
<td>ACCESSORIES</td>
<td>71</td>
<td>32.6%</td>
<td>1199.0</td>
<td>21.8%</td>
<td>16,887</td>
<td>0.67</td>
</tr>
</tbody>
</table>
Category Space Index:

% of demand / % of space

© 2001, George J. Mollo, Jr.
## Space Index

<table>
<thead>
<tr>
<th>Description</th>
<th>This Year</th>
<th>This Year</th>
<th>TY Perf.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pages</td>
<td>%</td>
<td>Demand</td>
</tr>
<tr>
<td>Spring 99</td>
<td>64</td>
<td>100.0%</td>
<td>5500.0</td>
</tr>
<tr>
<td>TOTAL DROP:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIFTS</td>
<td>20</td>
<td>31.3%</td>
<td>1204.5</td>
</tr>
<tr>
<td>HOME</td>
<td>14</td>
<td>21.9%</td>
<td>1353.0</td>
</tr>
<tr>
<td>APPAREL</td>
<td>16</td>
<td>25.0%</td>
<td>1743.5</td>
</tr>
<tr>
<td>ACCESSORIES</td>
<td>14</td>
<td>21.9%</td>
<td>1199.0</td>
</tr>
</tbody>
</table>
Sell Ratio:

(Item percent of page * cost per page) / Projected item $$ demand in Offer
## Sell Ratio

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Catalog Demand:</td>
<td>$5,000.0</td>
</tr>
<tr>
<td>Total Pages:</td>
<td>64</td>
</tr>
<tr>
<td>Total Selling Costs:</td>
<td>$1,370.0</td>
</tr>
<tr>
<td>Selling Cost Per Page: (Editorial ?)</td>
<td>$21,406</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Demand</th>
<th>Sell Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item A</td>
<td>$30k</td>
<td>17.7%</td>
</tr>
<tr>
<td>Item B</td>
<td>$20k</td>
<td>26.5%</td>
</tr>
<tr>
<td>Item C</td>
<td>$14k</td>
<td>38.0%</td>
</tr>
</tbody>
</table>

(25% page = $5351.5 Ad Cost)
## Department View

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
<th>Retail</th>
<th>MU %</th>
<th>Dmd $$</th>
<th>All % space</th>
<th>Sell Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>l/s Shirt</td>
<td>7.50</td>
<td>18.00</td>
<td>58.3%</td>
<td>15.7</td>
<td>0.62</td>
<td>0.25</td>
</tr>
<tr>
<td>s/s shirt</td>
<td>5.50</td>
<td>12.00</td>
<td>54.2%</td>
<td>22.7</td>
<td>0.90</td>
<td>0.25</td>
</tr>
<tr>
<td>plaid shirt</td>
<td>7.80</td>
<td>20.00</td>
<td>61.0%</td>
<td>11.4</td>
<td>0.45</td>
<td>0.25</td>
</tr>
<tr>
<td>henley shirt</td>
<td>8.00</td>
<td>22.00</td>
<td>63.6%</td>
<td>37.0</td>
<td>1.47</td>
<td>0.50</td>
</tr>
<tr>
<td>pique polo</td>
<td>10.00</td>
<td>32.00</td>
<td>68.8%</td>
<td>32.2</td>
<td>1.28</td>
<td>0.40</td>
</tr>
<tr>
<td>interlock polo</td>
<td>10.00</td>
<td>32.00</td>
<td>68.8%</td>
<td>25.3</td>
<td>1.00</td>
<td>0.25</td>
</tr>
<tr>
<td>denim shirt</td>
<td>9.15</td>
<td>27.00</td>
<td>66.1%</td>
<td>18.5</td>
<td>0.73</td>
<td>0.25</td>
</tr>
<tr>
<td>chambray shirt</td>
<td>15.00</td>
<td>38.00</td>
<td>60.5%</td>
<td>16.7</td>
<td>0.66</td>
<td>0.25</td>
</tr>
<tr>
<td>dress shirt</td>
<td>17.75</td>
<td>40.00</td>
<td>55.6%</td>
<td>20.2</td>
<td>0.80</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**Department Totals:**

- Avg Price Offrd: 26.78
- Avg Price Sold: 23.65 62.6%

Page Cost: 11,983

© 2001, George J. Mollo, Jr.
Forecasting Repeat Items

- What % of items will be planned for Repeat vs. New Items
  - Review History
- Identify Similar Items
- Consider “Wear Out” factors
- Review Relationships to other product (especially competing new product)
- Profit Projections (Is the item still justified?)
  - Suggestion: Add inventory carrying cost to margin calculation...
Forecasting New Items

- Identify Similar Items
- Varying Rules -- New Items should be > 20% of average
- Review Relationships to other product
- Consider competition (Internal & External)
- Profit Projections (Is the item justified?)
Other Forecasting Factors

• Final Item Forecasts should NEVER be done in isolation
  • Sum of the parts will ALWAYS be Greater than the Whole = OVERSTOCK

• When using “trend curves” generally 3 to 5 will suffice (Keep it simple!)

• Forecasts should be done by drop AND revise balance of season (use of AII makes this relatively easy)
## Average Item Index

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>drop 1</th>
<th>drop 2</th>
<th>drop 3</th>
<th>drop 4</th>
<th>drop 5</th>
<th>drop 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item A</td>
<td>l/s shirt</td>
<td>2.0</td>
<td>1.8</td>
<td>1.6</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item B</td>
<td>s/s shirt</td>
<td>0.4</td>
<td>1.4</td>
<td>2.0</td>
<td>5.0</td>
<td>2.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Item C</td>
<td>plaid shirt</td>
<td>1.0</td>
<td>0.8</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item D</td>
<td>henley shirt</td>
<td>0.9</td>
<td>1.0</td>
<td></td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item E</td>
<td>pique polo</td>
<td>2.0</td>
<td>2.0</td>
<td>2.2</td>
<td>2.1</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Item F</td>
<td>interlock polo</td>
<td>2.0</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Other Forecasting Factors

- Life of Item (> 1 Campaign)
- **Realistic Estimating**
  - Based on Demand NOT on Availability
- Maintain Relationship to Buy Plan
  - Don’t Spend $$ Twice
- Assortment Plan is the CONTROL
Improving Inventory Coverage

- Better Planning & Forecasting allows increased “Just in Time” Buying
- Longer Range Planning - Identifies “Horizon” of Need
  - Plan by “Horizon/Season” rather than “Drop”
  - Inherent “Creative Merchant” hurdle – overcome with 80/20 rule
- Planning Reduces “hidden costs”
  - Impact on Creative Schedules
  - Some DC issues
Improving Inventory Coverage

- Buys can be Scheduled
  - Based on “Horizons” and “Lead Times” – allows greater flexibility for change
  - Allows forecasts to be modified to improve fill rates (lower backorder costs, lower overstock, increased turns)

- Risk/Rewards of Overbuying Can be Considered - In Advance
Internet Forecasting

- New Medium/Channel
- Standard Catalog Benchmarks?
  - Demand, Response Rates?
- How to Measure?
  - Hits, Click-thru, Traffic, Actual Sales?
Internet Forecasting

- Plan Assortment
- Plan Sell-Thru
- Constantly Moving the Floor – and Adapting to Sales (Pull items on/off the Web Page)
- Approach
  - Combination of Retail & Catalog – (ratio of days/views offered to sell-thru/sales at base level??)
Possible Metrics for eCommerce

• Modify AII to account for Average Days On Line
  • Same relationship as AII, HOWEVER factoring Days on Line to obtain a NEW Average or Index

• Modify AII to account for Average Views On Line
SUMMARY

• Simplify the Process
• Reduce exceptions
• Use Averages
• Use of Indices
  • Indices Offer a Simplified Approach
  • Indices create a Reference Base of 1.0
• “Simple Checks” (Compare to Various Averages, Simple references, etc.)
Relationship Reviews !!

Multiple Measures (or Indices) Used Together - Will Improve the Reliability of the Forecast & Increase Profitability

For example:
- Performance Index with Space Index
- Space & Item Demand with Sell Ratio
- Average Item with Item Count (and Demand)
Benefits to Other Areas (Positive Profit Impacts)

- Inventory Buying can be “Scheduled” on a “Horizon”
- Horizon forecasts help DC in “bin profiling”
- Dramatic positive impacts to cash flow
- Reduced inbound freight expense (less expedited shipments)
- Reduced backorders & reduced overstock
- Higher fill rates (both initial and final)
- Increased “Bottom Line”
Inventory Forecasting

Art?

Science?

Crystal Ball?

or ............?

RELATIONSHIPS !!!!

With Work, Planning Discipline & Internal Communications

– Forecast Accuracy will Improve!