How to Measure and Grow Return on Marketing Investment across Markets and Marketing Actions

Professor dr. Koen Pauwels
Tuck School of Business at Dartmouth
Why measure Return on Marketing Investment?

- In services and manufacturing industries, marketing should create profitable growth.
- Operations and finance are accountable for return on investments, why not marketing?
- Return on Marketing Investment badly needed:
  - 80% of new products fail
  - 50% of advertising spending has no effect
  - 85% of sales promotions result in net losses
How to Measure ROMI?

- Structured Executive Opinion
- Market Experimentation
- Examining long-term data patterns
Limitations of Experimentation

- Experiments assess short-run impact, but are costly and don’t capture competitive reaction.
- Short-term and long-term effects over time?
- Impact on stages customer buying process (awareness, intention, satisfaction) and firm value process (sales, income, valuation)?
- Media and marketing budget allocation?
Long-term Response Modeling

- Econometric representation of customer, competitor and environmental drivers
- Yield performance response elasticity (ROI), in the short-run and the long-run
- Translate into actionable client advice for media allocation and marketing strategy
Long-term modeling challenges

- How long is long-term?
- How to model wear-in and wear-out?
- How to incorporate long-term reactions of retailers, competitors, company action (future decision making)?
Vector-Autoregressive Models

- Flexible model of complex dynamic interactions between a set of endogenous variables

- Unique perspective on marketing-performance:
  1) consumer response to marketing is dynamic
  2) competitive response to marketing actions
  3) company response: performance feedback
Long-term sales response model

• Conventional sales-price response model:

\[ S_1 = a_1 + \rho_1 S_{1,t-1} + b_{11} p_1 + b_{12} p_2 + \varepsilon_1 \]

\[ S_2 = a_2 + \rho_2 S_{2,t-1} + b_{21} p_1 + b_{22} p_2 + \varepsilon_2 \]

• But consumers forward buy and stockpile:

\[ S_1 = a_1 + \rho_1 S_{1,t-1} + b_{11} p_1 + \phi_{11} p_{1,t-1} + \phi_{12} p_{1,t-2} + \ldots \]
Long-term Marketing Model

- And competitors react with price change:

\[ P_2 = a_4 + \rho_4 \ p_{1,t-1} + \phi_{41} p_{1,t-1} + \phi_{42} p_{2,t-2} + \ldots + \varepsilon_4 \]

- And firms decide based on sales feedback:

\[ P_1 = a_3 + \rho_3 \ p_{1,t-1} + b_{31} S_{1,t-1} + b_{32} S_{2,t-1} + \ldots + \varepsilon_3 \]
Vector Auto-Regression (VAR)

\[
\begin{bmatrix}
S_{1,t}
\end{bmatrix}
= 
\begin{bmatrix}
\alpha_1
\end{bmatrix}
+ 
\begin{bmatrix}
0 & 0 & b_{13} & b_{14}
\end{bmatrix}
\begin{bmatrix}
S_{1,t}
\end{bmatrix}
+ 
\begin{bmatrix}
\phi_1^{ij}
\phi_2^{ij}
\phi_3^{ij}
\phi_4^{ij}
\end{bmatrix}
\begin{bmatrix}
S_{2,t-i}
\end{bmatrix}
+ 
\begin{bmatrix}
\phi_5^{ij}
\phi_6^{ij}
\phi_7^{ij}
\phi_8^{ij}
\end{bmatrix}
\begin{bmatrix}
p_{1,t-i}
\end{bmatrix}
+ 
\begin{bmatrix}
\phi_9^{ij}
\phi_{10}^{ij}
\phi_{11}^{ij}
\phi_{12}^{ij}
\end{bmatrix}
\begin{bmatrix}
p_{2,t-i}
\end{bmatrix}
+ 
\begin{bmatrix}
\varepsilon_{1,t}
\varepsilon_{2,t}
\varepsilon_{3,t}
\varepsilon_{4,t}
\end{bmatrix}
\]

- "long-term" can be few weeks, months or forever: decided by data: forecast precision vs. complexity
- Compute long-term ROMI as the net impact of consumer, competitor and company response
Price deal yields positive consumer response, but lowers future sales, especially if competitors react.
Discount ‘works’, so firm repeats

[Graph showing sales elasticity over weeks for different categories: Consumer, Competitive, and Company.]
Worst case: each time you promote it hurts your bottom line.
Best case: permanent benefits through consumer trial and learning
# Profitable Growth Conditions

<table>
<thead>
<tr>
<th>Campaign Marketing</th>
<th>Mature Markets</th>
<th>Changing Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business-as-Usual</strong></td>
<td><strong>Permanent Benefit</strong></td>
<td></td>
</tr>
<tr>
<td><strong>FMCG promotions</strong></td>
<td><strong>Automobiles</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Pharma advertising</strong></td>
<td><strong>Product innovation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Changing Marketing</strong></td>
<td><strong>Escalation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Automobiles</strong></td>
<td><strong>Evolving Business</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Price Rebates</strong></td>
<td><strong>Medical Services</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Escalation</strong></td>
<td><strong>Detailing</strong></td>
<td></td>
</tr>
</tbody>
</table>
Journal Advertising Works Right Away, then dies out
Direct-to-Consumer ads show Wear-in and Wear-out
What is the Best that could Happen?

Gross Margin $

Honda launches 1999 Odyssey
One-shot innovation increases Honda’s Firm Value Forever
Long-Term ROI Varies by Segment and Firm

- **Cars**
  - Toyota: Low ROI
  - Daimler-Chrysler: Moderate ROI
  - General Motors: Moderate ROI
  - Ford: Low ROI

- **Trucks**
  - Toyota: Moderate ROI
  - Daimler-Chrysler: Low ROI
  - General Motors: Low ROI
  - Ford: Moderate ROI

- **Minivans & SUVs**
  - Toyota: High ROI
  - Daimler-Chrysler: High ROI
  - General Motors: Low ROI
  - Ford: Moderate ROI
And by Innovation Level

The diagram shows the relationship between ROI Elasticity and Innovation Level, with two lines representing the Top Line and Bottom Line. The Top Line increases significantly as the Innovation Level increases, while the Bottom Line shows a decrease and then an increase.
In Contrast, Rebates Decrease Firm Value in the long run
As They lead to Competitive Escalation
Finally, are some Actions Needed to Maintain Sales?
### How to Grow ROMI?

<table>
<thead>
<tr>
<th></th>
<th>Mature Markets</th>
<th>Changing Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marketing Campaigns</strong></td>
<td>Continue to create better campaigns</td>
<td>Focus and be ready to handle growth</td>
</tr>
<tr>
<td><strong>Changing marketing</strong></td>
<td>Allocate $ to other marketing actions</td>
<td>Ensure marketing spending keeps up with sales</td>
</tr>
</tbody>
</table>
Help Managers Drive Growth

- **Managerial Goal** remains the same: Build and Defend Profitable Growth
- **21st C Reality**: Need to demonstrate ROMI faced with rising costs and channel power
- **Approach**: long-term response models yield measurable long-term benefits
- Translate into actionable managerial insights and need for future monitoring