Session 7: Demand Forecasting II

Simple Hierarchy-of-effect Model (cont’d)

- This simple structure decomposes the big problem of demand forecasting into three smaller problems.
- The long-run business success depends on the size of repeat purchase customers.
- Given this structure,
  \[ \text{Prob(Being Regular Users) = Prob(Aware) \times Prob(Trial|Aware) \times Prob(Repeat|Trial)} \]
- Then, if untapped market size is \( N \) (e.g., 50 million households) and average purchase unit is \( n \),
  \[ \text{Estimated Market Size = } N \times n \times \text{Prob(Being Regular Users)} \]

Popular Models

1. BASES II
   - Developed by SAMI/Burke Marketing Research in 1978
   - Use survey data
   - Sales volume forecasting
2. ASSESSOR
   - Silk and Urban (1978) (Journal of Marketing Research, May, 171-191)
   - Use simulation data of a store shopping environment
   - Market share forecasting
3. NEWS
   - Use survey data
   - Market share forecasting

Simple Hierarchy-of-effect Model (cont’d)

- Key of implementation of these three models is the estimation of transition probabilities of
  - Awareness → Trial
  - Trial → Repurchase
- Among these models, we will focus on the BASES II since
  - It uses survey data, which are much cheaper than ASSESSOR’s simulation data of a real shopping environment.
  - It requires a simple product/service concept.
    - ASSESSOR requires several different ads and packages.
**BASES II**

- **Stage 1 (Before-use measure)**
  - Shopping mall intercept interviews at four or more geographically dispersed cities
  - Respondents are not screened for category usage.
  - After presenting a product/service concept to respondents, the interviewer asks a set of questions such as like/dislike, trial intent (binary measure), purchase intent (binary and/or Likert scale), and purchase quantity/frequency of the product category.

- **Stage 2 (After-use measure)**
  - After several weeks, users are called on the phone to obtain after-use measures, which include some of before-use measures and repurchase intent.

---

**How Well Do BASES II Work?**

- In 1986 SAM/Burke brochure, “...we have established a validation database of over 200 cases. Based on our validation in the 1980’s, 90% of our forecasts (sales volume, as well as trial and repeat rates) were within 20% of actual volume, and over half were within 10%.

- **NEWS:** 18.5% (n=22 cases)
- **ASSESSOR:** 21.5% (n=44 cases)

---

**How to Use BASES II?**

- **Use sensible discounting factors**
  - the top box rule
  - Study a few similar product categories
  - Use multiple discounting factors
    - Optimistic and pessimistic sales forecast
  - The most difficult part is the estimation of awareness proportion, which depends on marketing plan.
    - How to find a good estimate on the relationship between marketing activities and awareness level?
    - e.g. Ad expenditure and Awareness level

- **Relationship between Ad expenditure and Awareness level**
  - Select similar product categories
  - collect data of current ad expenditure and awareness data of brands in these product categories
  - Ad expenditure data are readily available
  - If it is difficult to get current awareness rate data, measure awareness of these brands during shopping mall intercept study at the stage 1.
  - Pool all collected data and run a regression:
    \[
    \text{Awareness} = \beta_0 + \beta_1 \ln(\text{ad expenditure}) + \text{error}
    \]

---

**BASES II (cont’d)**

- Since SAM/Burke had an extensive database of thousands of tests across many product categories, they could make a good inference on:
  - Relationship between marketing expenditures and Awareness
  - Relationship between Awareness and Trial intent
  - Relationship between (Likert-scale) purchase intent and real trial
  - Relationship between (reported) repurchase intent and real repurchase rates

- The database could help them a lot because subject’s responses given a simple product/service concept typically suffered from over-estimation. The database allowed them to find good sales estimates through a discounting process.

---

**How to Use BASES II? (cont’d)**

- Relationship between Ad expenditure and Awareness level
  - How to find a good estimate on the relationship between marketing activities and awareness level?
    - e.g. Ad expenditure and Awareness level