

## 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,

$$\text{Prob(Being Regular Users)} = \text{Prob(Aware)} \times \text{Prob(Trial|Aware)} \times \text{Prob(Repeat|Trial)}$$

- Then, if untapped market size is N (e.g. 50 million households) and average purchase unit is n,  
**Estimated Market Size = N × n × Prob(Being Regular Users)**



## Survey-Based Demand Forecasting BASES II

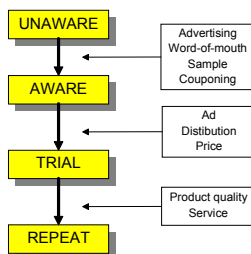


## Popular Models

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
  - Pringle, Wilson, and Brody (1982) (*Management Science*, Vol. 1, 1-30)
  - Use **survey** data
  - Market share forecasting



## Simple Hierarchy-of-effect Model



## Popular Models (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 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



## How Well Do BASES II Work?

- In 1986 SAMI/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? (cont'd)

- 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:  
Awareness =  $\bullet + \odot \times \ln(\text{ad expenditure}) + \text{error}$



## BASES II (cont'd)

- Since SAMI/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.

