Appendix [to be posted on the Marketing Science web site]

More Detailed Information about the Implementation Described in the Paper:

MOVIEMOD: An Implementable Decision Support System for Pre-Release Market Evaluation of Motion Pictures

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In this document we describe the procedures employed in implementing MOVIEMOD. The document contains detailed information concerning measures, scales, model's calibration, sampling, and projection.

Measures and Scales

A questionnaire was used to obtain estimates for the various parameters of the MOVIEMOD model. (It can be obtained from the authors upon request.) Both direct and indirect measures were used. Below we provide an example of a question (and illustrative analysis) used to obtain a direct measure, and an example of a question (and illustrative analysis) used to obtain an indirect measure for word-of-mouth duration parameter (μ).

Direct measure:

On average, how many weeks do you continue to talk to friends about a movie
that you have recently seen at a theater?
  a. 1 week or less
  b. 2 to 3 weeks
  c. 4 to 5 weeks
  d. 6 weeks or more

Illustrative analysis:

Suppose 30% of the respondents indicated option (a), 30% option (b), 25% option (c), and 15% option (d). An estimate for $1/\mu$ would be: (30 H 0.5 + 30 H 2.5 + 25 H 4.5 + 15 H 7)/100 = 3.075. Because μ is a parameter characterizing a Poisson process (intensity per week), the mean of the word-of-mouth duration process is equal to $1/\mu$ (average duration in weeks).

Indirect measure:

> Assume that you saw a movie this week that you liked. What are the chances you would still be talking to your friends about the movie two weeks after seeing the movie?
>   a. 90% change or more
>   b. 75% chance
>   c. 50% chance
>   d. 25% chance
>   e. 10% chance or less.

Illustrative analysis:

For the indirect measure we used equation (8) in the paper. First, we had to calculate the average survival probability, p_k (k = 2). Suppose 20% of the respondents indicated option (a), 15% option (b), 25% option (c), 30% option (d), and 10% option (e). The average survival probability is then (20 H 95 + 15 H 75 + 25 H 50 + 30 H 25 + 10 H 5)/100 = 50.75. Substituting the estimated value for p_2 in equation (8), we obtained an estimate for μ.

Similar measures and analyses were used for the other behavioral paramters (δ, λ, and γ). In the Dutch implementation, the number of measures employed were 2, 2, 4, and 1 for μ, δ, λ, and γ, respectively. To assess the reliability of μ, δ, and λ, 8 pairwise Spearman's correlation coefficients were calculated (1 for μ, 1 for δ, and 6 for λ). Their average value was 0.273.

Model's Calibration

Almost all of the parameters can be determined in a single-shot experiment. This is a very

efficient method of estimating the parameters. However, the Advertising Exposure Probability (described in the Operationalization and Empirical Testing Section) can also be estimated using a separate ongoing panel. We have described in the paper the type of questions required to estimate the probability of exposure to at least one media vehicle in our (single-shot) experiment. The analysis proceeds as follows. Suppose that 6% of the respondents say they have heard about a movie through trailers. For this movie, say, three weeks of trailers (with a certain intensity I) have been used until the time of measurement. Then the average awareness generated from the trailers at intensity I can be approximated as 6%/3 = 2% per week. Although this seems a rough approximate, it turns out that this time-efficient measure works reasonably well in practice.

The estimations can be done more accurately via a longitudinal panel. The panel is asked weekly about their awareness of various movies. The questions can be either open, or show a list of the movies that includes the ones that have been using at least one media-vehicle in that week. The respondents are asked if they have heard about (i.e., are aware of) the movie, and if they did, through which media-vehicle. When the media plans for the movies are known, it is possible to calculate the relationship between the intensity of the media vehicles and the awareness they generate, when the panel has provided information for a sufficient number of weeks, based on Equation (9). The media plans chosen for the estimation should have a sufficiently wide range of different media-vehicles, and at different intensities to obtain valid estimates. For example, not all the movies should use the same number of ads in the same newspapers, because then it is impossible to determine what the awarness would be if more (or fewer) ads in newspapers were used. Also, if none of the movies uses ads in newspapers, for instance, it is not possible to determine how much awareness this media-vehicle creates.

Sampling and Projection

It is critical that the sample should represent the (national) target market in its movies attendance behavior. In other words, the sample is viewed as a barometer (indicator) for the population interest in the movie. The extent of the population representativeness is determined by asking the respondents if they have seen a randomly selected number of movies (say 30) that have been shown in theaters in the last year. Next, the relationship between the proportion of people from the sample that have seen each of the movies and the national attendance of these movies is established using regression:

$$Y_i = \beta_1 + \beta_2 x_i + \varepsilon_i$$

where

y_i denotes the national attendance of movie i (can also be gross box-office figures)

x_i denotes the proportion of sample participants who attended movie i

ε_i denotes the disturbance term, and

$i = 1, ..., n$ where n is the number of movies.

The R^2 values obtained in the implementation described in the paper were 0.938 and 0.768 in the U.S. and the Netherlands, respectively.