

TEACHING THE POTENTIAL OF MICROCOMPUTER-BASED SPREADSHEETS IN EVALUATING STRATEGIC GROWTH ALTERNATIVES

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ABSTRACT

Applications of spreadsheets in marketing classes tend to focus on accounting and financial analysis. This paper offers an application rooted in marketing strategy. Four alternative growth models for a new product line are presented with suggestions for in-class exercises and advanced applications. A disk containing the spreadsheet files will be made available to interested instructors.

INTRODUCTION

Most spreadsheet applications in marketing classes focus more on accounting and financial analyses than they do on marketing analyses. That is, students are often asked to build or utilize pro-forma income statements to conduct profitability analyses and rarely have the opportunity to explore other marketing applications of spreadsheets. As a result, they leave our courses neither appreciating the variety of marketing problems to which spreadsheet analysis can be productively applied nor the potential of spreadsheets to impose structure on otherwise complex data-handling problems.

As a result of the focus on accounting and financial applications, students often conclude that microcomputers and microcomputer-based spreadsheets are not marketing tools. They do not recognize the power of these tools in analyzing marketing strategies or evaluating marketing opportunities. More specifically, they fail to understand the connections between spreadsheet analysis and fundamental marketing concepts. This is a most unfortunate outcome, because it means that we are giving students instruction in spreadsheet "operation," rather than providing them with an opportunity to assimilate how spreadsheets are inextricably tied (1) to the practical problems giving rise to their use and (2) to the conceptual frameworks required to build them.

The purpose of this paper is to provide instructors with an application of spreadsheet analysis to the problem of evaluating growth alternatives. This application involves quantification of a variety of important marketing concepts that would be extremely difficult to manage without a spreadsheet.

PROBLEM

The basic problem investigated in this application is estimating market size and forecasting market potential for a new line of infant products (a line extension) to be targeted toward middle and upper-middle class working mothers. Data required include (1) the number of births, (2) the average expenditures on comparable

items, (3) a market forecast for the market as currently defined (mothers aged 22 to 34), and (4) market forecasts for three different age-defined market segments that constitute growth alternatives. Because the data needed did not exist for these analyses, it was necessary to build a model based on existing data that would permit the required estimations and forecasts.

Before discussing this model, however, it is necessary to introduce the marketing strategy currently adopted by the manufacturer serving as the basis for this illustration. This manufacturer now segments his market in terms of occupation, reasoning that this is the best single-variable surrogate for income and psychographic characteristics required to support sales of the existing product line. In addition, as noted above, the manufacturer has traditionally focussed on women aged 22 to 34, reasoning that these are peak child-bearing years and where most market potential lies. In addition to these characteristics of the parent (buyer), the manufacturer believes that demand for the company's products may vary in terms of whether the user (child) is a first-born child or a second- or later-born child. It is also believed that demand varies in terms of whether the wife works or whether the husband is the only wage-earner. As will be discussed later, a number of these beliefs were untested at the time the model was being developed.

The manufacturer's segmentation decisions are the controlling factor in structuring the market-size model. Accordingly, the model is divided into three basic parts that both respond to these segmentation decisions and create a structure within which alternative models can be evaluated. These three parts (A, B, and C) are shown in Model 1 (see below), developed for the current market target (women aged 22 to 34).

Model Structure

Part A of the Model is derived from the segmentation scheme used by the manufacturer and from the basic effects of this segmentation scheme on market size as determined by different birth rates among the segments. The manufacturer defines the primary market for its products as "Mid-level white-collar working women whose occupations include teacher, secretary, social worker, first line supervisor, administrative personnel, high-tech sales representatives and similar white collar positions in finance, accounting, banking and communications." Thus, based on Census occupational categories, the model presents numbers of all women in the following occupations: managerial and professional, technical, sales, and administrative support and

some women (an assumed 10% share) in service occupations (U.S. Bureau of the Census, Series P-25, 1987). [Most women in service occupations fall outside the primary market definition both psychographically and economically. The assumed 10% share was based on a review of occupations included in this Census category.] The manufacturer defines the secondary market as "homemakers having a total household income equivalent to the total household income of the primary target customer; husband who is in a management or professional position." As such, we have selected for inclusion in calculations of the secondary market women who are not in the primary target market occupational categories but whose husbands are in managerial, professional, or technical and related support positions (U.S. Bureau of the Census, P-20, 1986). This includes women who are unemployed or not in the labor force as well as women in lower socioeconomic occupations. The numbers of women in the primary and secondary markets are shown in column 3 of the spreadsheet. The next step in building the spreadsheet involved the incorporation of birth-rate data (U.S. Bureau of the Census, Series P-20, 1987). These are shown in columns 4, 5, and 6. Note that birth rates are inversely related to occupational status. Columns 7, 8, and 9 multiply the birth rates by the numbers of women to compute the numbers of births in the base year (1986) for each of the occupations in the primary market. These numbers of birth were then summed, and the total births for the primary market were then divided by the total number of women to produce the birth rate for the primary market. These birth rates were then multiplied by the number of women in the secondary market to determine total number of births in the secondary market.

Part B of the Model is based on the total number of births in 1986 rather than the total number of women. That is, it takes the actual number of births occurring in the primary and secondary markets (first and second +) and calculates what percent of all births come from each segment. This calculation is critical to the model's usefulness in projecting future market size as derived from projections of expected births.

Part C adds to the Model data on per capita expenditures for product class made by the 22 to 34 year-old segment, based on industry data.

Projections

The basic model, as discussed above, is the first part of one spreadsheet file that also contains projections for the years 1987 to 1995. These projections are computed by applying percentages and per capita expenditures from the first part of the spreadsheet to the number of births which actually occurred in 1987 and are forecasted annually to 1995 (Wade 1987). The projection process, however, does not consist only of applying these percentages. In addition, two projected changes in labor force characteristics were also included.

First, the Model takes into account U.S. Department of Labor projections of anticipated female labor force participation (Fullerton 1987). The projected increase of .93% per year

was applied to our figures on percent of women in the primary market.

Second, the model takes into account U.S. Department of Labor projections of increases in employment in upper-status positions (Lukasiewicz 1987). The 1.76% annual compound rate of increase was applied to our figures on percent of women in the secondary market.

Based on the basic model structure and these projection procedures, the spreadsheet calculates estimates of total market size for the 22 to 34 year-old segment for the years 1987 through 1995. The Model is then used to conduct further analyses related to expanding into other age segments.

ALTERNATIVE MODELS

In addition to the model defining the target age segment as 22-34 year-olds, projections of growth alternatives were developed for three additional target age segments (models):

2. Target expanded downward to include younger women: 18 to 34 years old;
3. Target expanded upward to include older women: 22 to 44 years old; and
4. Target expanded in both directions to include all women in child-bearing years (excluding teenage pregnancies): that is, women 18 to 44 years old.

Because the spreadsheet file for 22 to 34 year-old women (Model 1) contains all formulas involved in the market size estimation and projection process, these additional analyses were completed through four steps: (1) copying the Model 1 spreadsheet to new files (for Models 2, 3, and 4); (2) adjusting the numbers of women in each occupational category; (3) changing birth rates to reflect age-related fertility differences; and (4) changing per capita expenditures to adjust for age-related buying-power differences.

IN-CLASS USE

The spreadsheet files for all four models contain basic model data and market-size projections for each year from 1987 to 1995. The authors will make available a copy of the files (Lotus 1-2-3.WK1 files) to instructors furnishing formatted blank diskettes (5 1/4"). We recommend duplicating copies of these files onto student diskettes to be used in classroom discussion and exercises. After an orientation to the basic model by the instructor, perhaps including exercises designed to assure comprehension of individual cell contents, the instructor can assign the following:

1. Identify differences between Model 1 and Model 2. Students should note: first, while overall first birth rate in Model 2 remains about the same as in Model 1, overall second birth rate is lowered by the addition of younger women; second, the percent of all births attributable to the 18 to 34 year-old segment is 25.42%, compared to 23.26% for the 22 to 34 year-old segment; and third, per capita expenditures drop for

the primary market as a result of adjustments made to account for the lower incomes of women and men 18-21. While Model 1 produced a 1995 market of \$473,618,000, the market for 1995 projected by Model 2 is \$538,531,000--14% higher. Students may compute that this 14% increase in total dollars requires a 20% increase in numbers of women addressed.

2. Identify differences between Model 1 and Model 3. Students should note: first, overall birth rates decline dramatically for first births and slightly for second or later births, yielding an overall drop from the current target's birth rate of 4.99% to a birth rate of 4.34%. Second, the percent of all births attributable to the 22 to 44 year-old segment is 29.90%, compared to 23.26% for Model 1. Third, per capita expenditures for the product class increase for the primary market as a result of adjustments made to account for the higher incomes of women and men 35-44. While Model 1 produced a 1995 market of \$473,618,000, the market for 1995 projected by Model 3 is \$686,688,000--an increase of 44%. This increase is associated with an increase in numbers of women targeted of 41%.
3. Identify differences between Model 1 and Model 4. Students should note: Birth rates decline for both first and second or later births. The percent of births attributable to the 18 to 44 year-old segment rises dramatically from the 23.26% projected for Model 1 to 34.13%. Per capita expenditures for first births decline considerably for the primary market but barely change in the secondary market. Per capita changes for second and later births are almost identical for the primary market, but increase for the secondary market. Total sales projected are \$752,024,000, an increase of 59% over 1995 projection from Model 1. The number of women required to produce this dollar increase is 61% greater than the current target.

ADVANCED APPLICATIONS

Instructors wishing to extend the above in-class uses of the models can assign two additional exercises.

4. Obtain new secondary data to update forecasts produced by the model.
5. Expand the targeted segment beyond 10% of service occupations to some higher level (chosen by the professor or students); or adopt a more focussed strategy and limit the target, for example, to professional and managerial women only.

CONCLUSION

The models presented offer students the opportunity to examine how market segmentation variables can be quantified; to see how microcomputer-based spreadsheets can be used to develop market size projections; to discover how growth alternatives may be evaluated; and to

appreciate the value of spreadsheets as a tool for analyzing marketing strategies.

Exercises 1, 2, 3, and 5 which challenge students to manipulate data provided in the spreadsheets are most appropriate for students in advanced undergraduate or graduate courses in marketing strategy or new product planning. Exercise 4 which requires students to obtain their own secondary data seems most appropriate for students in marketing research.

Student involvement with the models and spreadsheets presented here should enhance their appreciation of microcomputer-based spreadsheets as a marketing tool and their understanding of how spreadsheet analysis can be applied to market segmentation analysis and forecasting.

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