WHAT DOES R^2 HAVE TO DO WITH A PRODUCT MANAGEMENT COURSE?

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ABSTRACT

An approach to a Product Management course which utilizes the Ness and Day game and interactive SPSS is discussed in this paper. The benefits of learning how to play a game dealing with consumer products like soft drinks is important *for* the Student as he/she develops management skills. The importance of leaning how to use a canned statistical program like SPSS and doing it interactively is realized as the business world becomes more involved with interactive terminals and data analysis. The combining of these two ideas in the product management produces a synergistic result in the course since the resulting learning from the course will be more than if either were used by itself.

INTRODUCTION

In the Product Management course, the Day and t4ess Marketing In Action (MIA) game is utilized as a simulation of the soft-drink industry [1]. As an adjunct to this game, and to make the course more of an integrative course than it might otherwise be, a statistical perspective has been applied to the course. Not only do the students need to apply the statistics leaned in the basic courses, but a knowledge of interactive SPSS is also required. This latter knowledge can be taught **in** the course if it has not been acquired already in a research course. The application of this statistical approach is currently in the second of three stages in the Product Management course at Western Illinois University. What does R2 have to do with a Product Management course? It has great significance in the course when students are able to study the statistical relationship between variables in order to make better decisions. Determining the amount of variation in one variable explained by another(s) can be quite beneficial in playing a decision oriented game like Marketing In Action.

THE THREE STAGES OF THE STATISTICAL APPROACH

The first stage of the approach maintained the following format:
1. The Marketing In Action simulation is introduced to the students and a quiz is administered to ensure mastery of the manual.
2. The students operate as teams, turning in twelve decisions (1 year).
3. Then the students begin to learn interactive SPSS and the application of statistical concepts.
4. The students then use the statistical information while making the next twelve decisions.
5. Finally, the students prepare a final report which explains what their strategy was, how it worked, and their analysis of what occurred during the simulation.

The second stage of the approach is currently being used and involves the following steps:
1. The MIA simulation is introduced and a quiz administered.
2. Students begin to learn interactive SPSS and statistical analysis with a self-paced tutorial.
3. Once Students are familiar with *SPSS,* the results of the previous semester's class are made available for analysis. That information is utilized as a basis for making the first twelve decisions.
4. The students make decisions for the first twelve periods.
5. The results of the first twelve periods are computerized to allow students to analyze that data before making the thirteenth decision.
6. Subsequent decisions (including the introduction of new products) are made based on the knowledge gained from analysis of the historical data.
7. A final report is prepared as described above.

The third stage of application will be changed so that the students will have to analyze the first twelve months before making the thirteenth decision, and a total of twenty-four months results before making the twenty-fifth decision, and prepare a decision-making model.
1. The students are introduced to MIA as before.. Additionally, a preliminary report is prepared describing the strategy each team plans to use.
2. Students begin to learn interactive SPSS and statistical analysis using the previous semester's data.
3. The students analyze the old data and develop a model for playing the game based on that information.
4. Students make the first twelve decisions.
5. After the first twelve decisions, the data is computerized. Each team analyzes that data and prepares a report describing the strategies to he employed for the next twelve decisions.
6. The next twelve decisions are conducted.
7. After 24 decisions, all results are computerized and make available for analysis.
8. Students modify their decision-making model and make three more decisions.
9. A final report is prepared as described above.

The fall, 1980, class is in the second stage of application. In order to make this approach as clear as possible, handouts have been developed to guide the students as they learn interactive SPSS and the meaning of R2, R and other relevant statistics. Part of the handout given to them is included as the next section of the paper.

STUDENT HANDOUT

Introduction to Research

The simulation exercise used in Product Management incorporates numerous decision variables which each team must manage. Although the simulation is much less complicated than the marketing environment of the 'real' world, the basic problems faced are the same-how to make decisions with imperfect information. In order for management to optimize profits by means of its marketing strategy and tactics, it can have research

conducted for it. This tutorial will assist you as you endeavor to investigate the industry as well as your company's performance.

Canned statistical programs have been written so that persons with relatively little sophistication in computer programming can easily (7) use the computer for their own ends. You will be using the SPSS canned statistical package that you used in Volume 1 [3] to generate needed associations between the decision variables.

Introduction to Marketing in Action Data

The Marketing in Action (MIA) simulation provides considerable information to participants (teams) with each period's results. Much more information is available in the form of marketing research requests; this is at a cost to each team. Careful and judicious purchase of this research is seemingly a requirement for success in the simulation just as it is in business. Four reasonably inexpensive items of research should be purchased frequently: market shares, prices, advertising and sales force levels. The latter three tend to have the greatest effect on the relative successes of teas as they pursue a marketing strategy.

Thorough analysis of these inputs" and corresponding "outputs" (e.g., profit and sales) can give one an understanding not only of what happened in the simulation but why.

Using Subfiles

In Volume 1 of the system file series, the data were arranged by variable across the computer card but the cards were not arranged in any particular order. The MIADATA data file is arranged by variables and also by team number. This enables the analyst (you) to conduct statistical analyses on the entire industry and also on each team. The SUEFILE procedure enables this type of analysis. Notice that in the MIAPROG program that the sixth procedure name is SUBFILE LIST. The specification field indicates the name of the subfile and how many cards are contained in the subfile. TEAM1 is the first subfile name and it has 12 cards (one for each month or decision).

If you want to have the analysis for the industry, do not insert any new lines in the program or you may type in something like

9 RUN SUBFILES;ALL

If you want the analysis for only one team, type in only the name of the subfile (team) you want in parentheses.

9 RUN SUBFILES;(TEAM1)

If you want the analysis for each of the teams. use the keyword EACH.

9 RUN SUBFILES;EACH

Continuing Analyses

In the following pages, you will find examples of how to obtain various statistical analyses and examples of the analyses for the MIASYS file. In addition to these you might want to obtain a pictorial view of the relationship between any two variables by using the SCAT- TERGRAM procedure name.

10 SCATTERGRAN;VAR1 WITH VAR2, VAR8

Quickly Review before Proceeding

1. After getting into interactive SPSS and Into AUTO-MODE, always type

    5 GET FILE; MIASYS as your first line.

2. Procedure names like GET FILE, RUN SUBFILES, FREQUENCIES, REGRESSION, PEARSON CORR, STATISTICS and LIST CASES are given whole numbers usually in increments in 5.

3. The specification fields for each of the above procedure names are given the appropriate whole number and then a .5 (e.g., 5.5, 10.5 etc).

4. To change an error while in AUTOMODE, you retype the line number and the information. Or, you may type "Genral*General* 10.5
    This indicates that the word General was misspelled in line 10.5.

5. To execute an analysis at the terminal, simply type E and wait for the analysis to be displayed.

6. To execute the analysis and have it disposed to the printer, type E,JUNK and then leave AUTOMODE by typing END and then typing
    -LISTFIL(IDENT=XXX, FYL=JUNK)

7. When requesting a fairly lengthy printout, you might want to do the following. Type

    1 EDIT
    E

    If the program is correct, then no error message will appear. If no errors are present, then type
    D 1 for Delete line I
    E, ANLYSIS

    and proceed with the disposing of the output to the printer.

8. You will probably be using

    PEARSON CORR
    STATISTICS
    REGRESSION
    STATISTICS
    LIST CASES
    FREQUENCIES

    the most in your analysis of your team and your competition.

You have now completed the appropriate lessons in Volume 1 of the system file series. You will now use this knowledge and apply it in this volume to the results of MIA over twelve decision periods. The information is not for this term's teams but for the fall, 1979, teams. You will be given the data for your teams after you have completed this tutorial. You will be using SPSS to do the analysis on both sets of data.

The MIAPROG Control File and the MIADATA Data File

The SPSS control program that was developed according to the setup of the data in the MIADATA data file is shown below and was placed into the file called MIAPROG. You will not be using either MIADATA or MIAPROG since you will be using an SPSS system file called MIASYS. MIASYS, in effect, contains both the control file and the data file so that execution of the analysis is much easier than using the two file approach (control and

data files). For your tern's data, you will also have access to VAR9, Product Effectiveness Score and VAR10, Cross Margin in dollars. The actual MIADATA FILE is given on the next page.

FIGURE 1

MIAPROG CONTROL FILE

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RUN NAME          MARKETING IN ACTION, RESULTS, 1979
VARIABLE LIST     PRIOD,TEAM,VAR1 TO VAR8
INPUT FORMAT      FIXED(F2.0,1X,F1.0,1X,F7.0,1X,F3.1,1X,
                  F7.0,1X,F3.0,1X,F6.0,1X,F7.0,1X,F3.0,
                  1X,F6.0)
PRINT FORMATS     VAR2,VAR4(1)
INPUT MEDIUM      MIADATA
SUBFILE LIST      TEAM1(12) TEAM2(12) TEAM3(12) TEAM4(12)
                  TEAM5(12) TEAM6(12)
N OF CASES        72
VAR LABELS        PRIOD,PERIOD NUMBER/
                  TEAM,TEAM NUMBER/
                  VAR1,SALES IN DOLLARS/
                  VAR2,PERCENTAGE OF MARKET SHARE IN $/
                  VAR3,SALES IN CASES/
                  VAR4,PERCENTAGE OF MARKET SHARE IN
                  CASES/
                  VAR5,ADVERTISING BUDGET IN DOLLARS/
                  VAR6,PRICE PER CASE/
                  VAR7,SALES FORCE SIZE/
                  VAR8,NET PROFIT IN DOLLARS/
FREQUENCIES       GENERAL=ALL
STATISTICS        ALL
READ INPUT DATA
FINISH
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Since the data file is too long to be reproduced in this paper, it will be available in a working paper at the conference.

EVALUATION OF THE APPROACH

This manner of approach enables the students to use a more quantative style of managing their own "firms" in the simulation. Students are able to apply statistical knowledge learned in other courses. The concept of a market response function becomes much more real as students are able to statistically determine various relationships such as the effect of a given change in price on market share or profits.

Since not everyone in the course has the same level of expertise in statistics and computer skills, a handout was developed to lead the students through the approach with as little effort as possible. Those in the course have had Statistics but not everyone has the research course in which SPSS is used as a tool of data analysis. Therefore, a very simplistic SPSS approach, the system file approach, has been used in this course. With a minimum of instructions, the students are able to call up an existing system file and place in the appropriate procedure names and specification fields to run frequency distributions, correlation coefficients and regression coefficients. These techniques can be run for the entire industry and for each team. Therefore, the performance of their team (and competitors) can be matched against the overall industry and against each other.

This approach has also been successfully used in other classes [3;4L The students in these courses are able to grasp the fundamental concepts in using the statistical approach. Since the final and third stage has not been reached yet, no formal evaluation techniques have been applied to the first two stages. The final reports which are group prepared reflect not only an explanation of the teams' Strategies used, but a demonstration of understanding WHY events transpired as they did. By means of the appropriate statistical

analyses, students discover which decision variables impact most heavily on the results. Also, they can uncover their competitor's Strategies via historical analysis. What does R2 have to do with a Product Management course? It can add many new dimensions into a relative subjective marketing game framework. It can also brings new dimensions of statistical analyses and interactive processing to the class that aid in quantifying decision making.

REFERENCES

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[3] Thistlethwaite, Paul, Interactive SPSS: A System File Approach, Vol. 1 (Macomb, Illinois~ WIU, Center for Business and Economic Research, Occasional Paper, 1979).

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