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AN ANALYSIS OF STUDENT ATTITUDES, PERFORMANCE, AND STRATEGIES
IN A SIMULATION COMPETITION BASED ON A CONTROLLED
PRODUCT-MARKET ENTRY GAME STRUCTURE

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ABSTRACT

Playing a simulation game under a controlled product-market entry game structure versus the traditional full-game entry approach creates a more positive and intense learning environment, which requires greater decision-making skills on the part of the game participants. As well, this approach allows the simulation administrator to introduce some basic marketing strategy principles and gives the participants time to learn the complex environment in which they are operating.

INTRODUCTION

The normal competitive approach for simulation game participation is to allow each company to enter all of the game's product-markets from the outset of the competition. In a two-product, two-territory game like *The Marketing Management Simulation* (Faria and Dickinson, 1996), this means that each company will make decisions, starting in Period 1, for four product-market cells. In a three-product, three-region game like *Compete: A Dynamic Marketing Simulation* (Faria, Nulsen and Roussos, 1994), decisions for nine product-market cells are made beginning in Period 1. It is unusual for a game participant to leave a product-market empty for fear of losing a market opportunity to the competition.

This full-game approach not only presents each company with an overwhelming decision-making task, it also removes the opportunity for companies to develop product-market entry

strategies. Participation in any simulation game requires the participants to learn how to play the particular game and how to make effective decisions. Accomplishing these tasks takes time. Quite often, trial periods are used as a no-risk learning device to allow the participants to acquire some feel for the game before performance evaluation commences. Trial periods, however, do not afford the participants the opportunity to develop product-market entry strategies. This paper, as such, reports on an experiment in which participants in a three-product, three-market simulation game began the competition in one product-market and were later able to add products or markets in accordance with a well-known marketing strategy model.

LITERATURE REVIEW

No past studies have reported on a controlled market entry approach to a simulation competition as will be described in this paper. However, three studies have addressed issues that are relevant to the present study.

Cannon (1995) discussed what he referred to as the *complexity paradox*. The basis of the complexity paradox is the problem that, on the one hand, developers want to make their simulations realistic, but, the more realistic the simulation becomes, the more complex it becomes. At some point, and this is the case with most simulations according to Cannon, the games become too complex for participants to understand how the market is reacting to individual game decision variables. Hence,

there is some question as to what participants might be learning from the simulation.

In terms of learning, there has long been debate as to what, if any, learning takes place in simulation games (Wellington, Whiteley, Faria and Nulsen, 1995). While studies examining the relationship between simulation game performance and performance on course final exams have shown mixed results (e.g., Anderson and Lawton, 1992; Washbush and Gosenpud, 1993; Wellington and Faria, 1991; Whiteley, 1993; Whiteley and Faria, 1990), a more important concern is whether simulation games can teach specific concepts. Two recent studies (Malik and Howard, 1995 and Roge, 1995) suggest that they can.

Malik and Howard (1995) developed a simulation to specifically teach the game participants about the Market Movement Model (essentially a product life cycle decision-making approach) and how to develop strategies over the market life of a product. Decision-making that was consistent with the use of appropriate strategies at each stage of the product's life cycle would be rewarded. Malik and Howard (1995) report that their game participants learned how to develop strategies consistent with the Market Movement Model.

Roge (1995) used a complex marketing simulation to teach students about Porter's Generic Competitive Strategies (Porter, 1985) which consist of cost leadership, focus and differentiation. Companies are urged to follow one of the strategies and not get "caught in the middle." Roge (1995) reports that game participants were able to distinguish between each of the strategies, select one, and avoid the pitfall of getting caught in the middle.

PURPOSE

The purpose of the present study is to examine how a simulation competition can be orchestrated so as to overcome the complexity paradox and, at the same time, teach a basic marketing strategy model to the game participants.

Beyond the issue of complexity, requiring decisions for all product-markets from the very beginning of a competition is inconsistent with normal marketing practice. In the external environment, companies gradually acid products and markets as time passes. Southwest Airlines, ValuJet, McDonalds, and Wendys are prime examples of firms, which have used product and/or market development as growth strategies. Hence, shouldn't this be the case with companies in a simulation competition?

In a simulation game context, a controlled product-market entry game structure requires the game administrator to regulate, at least to some extent, where companies can operate and when a new product-market can be entered. Individual company product-market decisions must be made within the constraints set by the game administrator. The pedagogical value of the controlled approach can be determined (1) by investigating the strategies used during the period of play, (2) by measuring participant attitudes after the period of play, and (3) by examining the performance levels achieved during the period of play.

METHODOLOGY

Subjects

Data for this study was obtained from the activities of 60 students in a six-week summer session section of a Marketing Problems and Applications course. This is a follow-up to the

Developments In Business Simulation & Experiential Learning, Volume 24, 1997

basic Principles of Marketing course. While the participants were aware that their game activities were being analyzed, they were not aware of the purpose.

Material

The simulation game used in this course was *Compete: A Dynamic Marketing Simulation* (Faria, Nulsen and Roussos, 1994). As previously indicated, *Compete* is a three-product, three-region game. This game structure results in nine competitive product-markets. The three products that can be produced and sold by the companies are a Total Spectrum Television (TST), a Computerized Video Editor (CVE) and a Safe Shot Laser (SSL). The companies can further operate in three geographic territories known as Regions 1, 2 and 3.

At the end of the course, the participants were given a 12-question survey to complete. The survey sought information pertaining to participant perceptions about the nature of the simulation competition, particularly with respect to the participants' previous simulation experiences in the Principles of Marketing course. In the first course, the students played *The Marketing Management Simulation* (Faria and Dickinson, 1996) and were allowed to enter all product-markets from the start of the competition.

Design and Procedure

Industries. At the beginning of the term, the 60 students were randomly assigned to twelve 5-company industries, identified as industries A through L. Due to class attrition, only 56 students completed the course. Specific default values were used for the remainder of the game once a company actively ceased operations.

Product-Market Entry. A controlled product-market entry structure was used throughout the game in order to overcome the complexity paradox and to teach a basic marketing strategy model. The nature of the allowed decisions during Periods 3 and 7 were the most critical for the companies. A company which did not make decisions consistent with the Marketing Opportunities Matrix (McCarthy and Perreault, 1995) was denied entry into the product-market selected. The Market Opportunities Matrix is a well-known marketing strategy/market expansion model discussed in all basic marketing textbooks. This model is also referred to as the Product-Market Expansion Grid (Kotler, 1994) and as the Product-Market Growth Matrix (Stanton, 1995). Specifically, each company was required to follow the decision sequence identified in Table 1, which variously allowed for the use of a *product development*, *market development*, or *diversification* strategy. Hence, the simulation participants learned about these basic marketing strategies through the decisions that they were able to make in the simulation competition.

If a company made correct decisions throughout the game, by the end of the competition, the company could be operating in up to five of the nine product-markets available. All companies were apprised of the entire decision schedule before the start of the game.

Performance Evaluation. Course grading included a midterm and final exams, Period 4 and Period 8 cash flow statements, a variety of written game reports, group case and project presentations, and game performance. Game performance represented 28.6% of the course grade (60 of 210 points).

Within each industry, game performance was based on a company's relative earnings per

Developments In Business Simulation & Experiential Learning, Volume 24, 1997

share (EPS) and relative market share for the entire game. The earnings per share evaluation was determined as follows:

$$\text{EPS Evaluation} = \frac{\text{Team EPS} + \text{Industry EPS Range}}{\text{Leading Team EPS} + \text{Industry EPS Range}} \times 100$$

This formula minimizes the negative impact of extreme performance variations within an industry. The market share evaluation was determined using the following formula:

[(Individual Company Market Share/Leading Company Market Share) x 100]. The overall performance evaluation was then determined by combining these two results via the following formula: [(EPS Evaluation + Market Share Evaluation)/2]. Market share was measured in terms of units sold.

RESULTS

Information about the period-by-period game activities and the results from an end of competition survey will be presented.

Period Product-Market Strategies

The structure of the simulation competition allowed the companies to add and delete product-markets during the period of play. In certain periods, certain constraints were placed on the nature of the decisions that were allowed.

Period 1. At the start of the game, all companies were restricted to CVE2, *i.e.*, the sale of the CVE product in Region 2. This restriction resulted in a very competitive market situation for all companies. Profit and unit sales opportunities were limited.

Period 2. In Period 2, each company was free to enter one of the remaining eight product-markets - in terms of the Marketing Opportunities Matrix

this would constitute a *marker development strategy*. At this point in the game, the participants had their first opportunity to create a monopoly situation if they could become the sole operator in a particular product-market. At least one firm in every industry was able to accomplish this.

Period 3. In Period 3 all companies were allowed to enter a product-market of choice as long as the decision was consistent with a *product development* strategy as defined by the Marketing Opportunities Matrix. A decision was only acceptable if the company developed a product for a currently served market (*i.e.*, region). Two companies were denied entry in the product-market of choice because of inappropriate decisions.

Period 4. In Period 4 all companies were free to enter one of the remaining six product-markets - a market development opportunity. This period represented a real sales growth opportunity for each firm.

Period 5. In Period 5, each company was allowed to add a product-market as long as it deleted one of its active product-markets. This allowed the companies to drop a product-market that was not performing at a satisfactory level and to add a product-market that could improve the performance of the firm. This period was also the time for those firms that were operating in all three regions to leave a region so that they could take advantage of the *marker development* opportunity that would be available in Period 7.

Period 5 was the most disastrous period for many companies. While 22 companies made no product-market changes during this period, 9 of these companies should have opened up a region so that they could engage in market development in Period 7. An additional 15 companies made product-market changes

during this period, but the decisions did not open up a region for Period 7. Thus 23 of the 56 companies were not in a position to add a product-market in Period 7.

Period 6. In Period 6 no product-market additions or deletions were allowed. This period became a period of stability so that the various companies could adjust to the product-market portfolio developed up to this point in the game.

Period 7. In Period 7 all companies were allowed to enter a product-market of choice as long as the decision was consistent with the concept of *marker development*, as defined by the Marketing Opportunities Matrix. Only 33 of the 56 companies could make such an addition. One of these companies chose not to take advantage of this opportunity. A maximum of five product-markets were now allowed in the game.

Period 8. In Period 8 no product-market additions or deletions were allowed. This period of stability allowed the respective companies to take advantage of the product-market portfolio developed by Period 7. Those firms that carried the full product-market complement of five cells had the opportunity to gain on their competitors.

End-of-Competition Product-Market Analysis

While all of the companies in all industries started in the same product-market (i.e., CVE2), product-market entry and deletion decisions were the sole responsibility of each company, subject, of course, to the constraints placed by the game administrator. Table 2 presents the end-of-competition product-market status for all companies. By the end of the game, a company could be operating in five of the nine product-markets. Across the 56 companies, the range was 4 to 5 product-markets and the average was 4.5.

Interestingly, in no

An analysis of the number of companies operating in each product-market indicates that while there are relatively minor regional differences, there is a certain degree of avoidance of the SSL product across all regions. Table 4 indicates that the SSL had the lowest market participation rate, regardless of the region. (It might be noted that the SSL is the lowest price, lowest margin product.) Nonetheless, the data in Table 2 indicates that 15 of the 21 monopolies were in the SSL product-markets. The TST and CVE product-markets each hail only three monopolies.

Table 5 indicates that those firms that were able to maintain monopolies to the end of the competition were likely to outperform their competitors. Fifty percent of the monopoly firms achieved the highest EPS within their industries. On the other hand, fifty percent of the non-monopoly firms occupied the two lowest performance ranks while only 6 percent of the monopoly firms performed at this level.

Survey Summary

Forty-six completed questionnaires were obtained from the 5s6 game participants at the completion of the competition. The 10 non-responses reflected a failure to attend class the day the questionnaire was distributed. Due to space limitations, only a brief summary of participant responses to the questionnaire will be presented here.

Overall, 87 percent of the respondents found this simulation competition to be more competitive than their first experience in which they were able to enter all product-markets starting in Period 1. At the same time, 87 percent of the respondents found this

competition to be more difficult than their first experience. Further, 80 percent of the respondents felt that the cell-by-cell expansion approach used in this competition was demanding and difficult. Eighty-four percent of the respondents felt that the cell-by-cell approach required greater decision-making skills. As well, 84 percent of the respondents felt that the cell-by-cell approach created a “more competitive atmosphere. Finally, 82 percent of the respondents felt that the cell-by-cell approach provided for more opportunities to learn about marketing strategy.

DISCUSSION AND CONCLUSIONS

By the end of the competition, with sound long-term planning, companies could be operating in five of the nine product-market cells of *Compete*. Due to poor planning in game Periods 5 and 7, some companies were operating in only four cells. In selected periods, several companies made “illegal” decisions in terms of the game constraints placed by the administrator. Some of the illegal decisions were caught at the time they were made and corrective action was taken. Several were not caught until the competition had progressed several periods. At this time, the companies were assessed penalty fees as might be done to firms in violation of the antitrust laws.

Overall, the approach used in this competition proved to be very successful. Beginning the competition in one product-market and then allowing expansion served to overcome what Cannon (1995) referred to as the complexity paradox of simulation games. The cell-by-cell expansion approach used served to illustrate for the student’s basic marketing strategies that are taught in all introductory marketing courses. Finally, the students enjoyed the strategy elements and long-term planning introduced to the competition through the use of this approach. This approach is worth considering by simulation game users.

(References and Tables available on request.)