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AN EMPIRICAL INVESTIGATION OF COGNITIVE AND PERFORMANCE CONSISTENCY IN A MARKETING SIMULATION GAME ENVIRONMENT

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ABSTRACT

The relationship between the cognitive understanding of a simulation game environment and game performance was investigated. The results indicate that how well one performs in a game, in terms of earnings per share, market share, or a combination of both performance measures, is independent of the cognitive understanding of the structure of the game environment encountered.

INTRODUCTION

A common approach used for management training is the computer-based simulation game. It is assumed that active participation in this experiential approach to learning allows players to develop and improve their decision-making skills. Performance measures such as earnings per share, return on investment, market share, or some combination of these performance outcomes are generally used as indicators of effective decision making. And since it is assumed that those who perform better in a game competition have a better cognitive understanding of the parameter structure of the game, it is appropriate to investigate the relationship between game performance and this cognitive understanding. This type of analysis will determine whether using game performance as a surrogate indicator of cognitive learning is appropriate.

METHODOLOGY

In order to investigate the concerns of the present study, the simulation game entitled "LAPTOP A Marketing Simulation" (Faria & Dickinson, 1987) was used since this game allows the game administrator to determine the importance (i.e., weight) of each parameter of the game. In particular, the importance of the game parameters were set such that two theoretically meaningful experimental environments were created. One of the experimental environments was designed to reward the use of a 'pull' strategy (focus on consumer demand stimulation). The other environment was designed to reward the use of a "push' strategy (focus on the enlistment of channel cooperation in moving a product through the channel. The exact nature of the between-environment parameter weights is described in Whiteley, Dickinson, and Faria (1992).

Sixty-eight undergraduate students enrolled in two sections of a one-semester principles of marketing course participated in the simulation game competition. Relative (i.e., compared to the direct competition) end-of-game earnings per share and relative end-of-game market share were used as the performance measures. A game (cognitive) environment evaluation was obtained by administering a questionnaire during the competition.

The 68 participants were assigned to 14 industries on a random basis. Each industry consisted of *5* single-player companies. Seven of the industries (i.e., *35* companies) were randomly assigned to the "PUSH" environment and *7* industries (i.e., *35* companies) were randomly assigned to the "Pull" environment. The participants were not told about the nature of the environment to which they were assigned, nor did they know that any experimental manipulation had taken place. [Two companies were operated as dummy companies throughout the game in order to equalize the number of companies per industry. The data for these companies were not analyzed.] Complete data were obtained from 29 participants in the pull environment and from 26 in the push environment.

The participants engaged in a ten-period competition, making decisions only for the deluxe version of a laptop computer (Deluxe 200) which was sold in Territory 2. The first two (quarterly) decisions served as trial decisions.

While the participants were given a cognitive evaluation form to complete prior to receiving the game results for Real Periods 1, 4, and 8, only the evaluation for Real Period 8 was analyzed because of the end-of-game focus of the study. These forms were used to obtain each participant's perception of the importance of each decision variable in terms of stimulating demand and the importance of various types of research information to the game.

HYPOTHESES

The general hypothesis of the study is that, if marketing strategy development in a simulated environment is an internally valid experience, then the cognitive decisions should be consistent with the environment with which the decision-maker must contend. Furthermore, based on the performance outcomes, the cognitive interpretation of the environment should evolve such that more effective decisions are made. Not understanding the structure of the environment should lead to ineffective decision-making (i.e., poorer performance outcomes).

With respect to the present study, a measure of cognitive understanding of the structural nature of the encountered environment can be determined by comparing the perceived importance of a given decision area to the corresponding pre-set parameter weights. The greater the absolute level of congruency between the perceive variable-importance and the actual variable importance, the greater is the defined level of cognitive understanding of the encountered environment. Furthermore, greater variable-importance congruency is expected to be positively related to earnings per share, market share, and a performance measure based on equally weighted earnings-per-share and market share. A negative correlation between congruency and performance is expected.

RESULTS AND DISCUSSION

The results provide limited support for the expected relationships between valuable-importance congruency and performance. The paucity of significant, negative correlations clearly indicates that performance results are generally independent of the cognitive understanding of the structural nature of the environment with which a player had to contend. For all participants combined and for those in the 'push" and the 'pull" environments separately, the importance of low price (pull), high sales force size (push), the use of point-of-purchase sales promotion (push), the use of trade show sales promotion (push), price research (pull), and co-operative advertising research (push) are independent of the three performance measures [p> .05].

The six significant negative correlations obtained, together, offer only very limited support for the hypotheses of the study: $r = -.36$ ($p < .05$) between high broadcast advertising (pull) and the combined performance measure of earnings per share and market share [Pull group]; $r = -.42$ (p .05) between high print advertising (pull) and earnings per share [Pull group]; $r = -.45$ ($p< .01$) between high trade advertising (push) and market share [Push group]; $r = -.49$ ($p < .01$) between high trade advertising and the combined performance measure of earnings per share and market share [Push group]; $r = -.38$ (p .05) between high cooperative advertising allowance and market share [Push group]; and $r = -.36$ ($p < .05$) between high product quality and earnings per share [Pull group].

Thus, overall, the results of the study fail to provide sufficient support for the relationship between game performance and the structural understanding of the environment with which a game participant has to contend. Using game performance as a surrogate indicator of the cognitive understanding of a game environment therefore may be inappropriate. Without the proper structural understanding, appropriate behavioral and performance results should not be forthcoming. The limited number of significant negative correlations between the importance congruency values for the decision variables and the identified performance measures obtained in the study is consistent with this expectation.

REFERENCES

Faria, A. J., & Dickinson, J. R. (1987) Laptop: A marketing simulation. Piano, TX: Business Publications, Inc.

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