

Developments in Business Simulation & Experiential Exercises, Volume 14, 1987

SIMULATION: THE PLAYERS PERSPECTIVE

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ABSTRACT

This paper is a report by the team that took home the trophy in the first ABSEL Georgia Southern College (GSC) Multinational Game Competition, which was held during the winter, 1986. It discusses the tools that were used to analyze the data and convert it into information and knowledge needed to make the decisions, how the team was selected and the simulation itself. The assumptions and theories used by the team are also discussed. The paper describes the group dynamics, including how the team members interacted, especially when encountering severe problems with one team member. This paper was written in drafts produced by the three team members and consolidated into a single paper by their team advisor.

INTRODUCTION

In the winter of 1986, a simulation competition was sponsored by ABSEL and GSC. The contest utilized The Multinational Management Game by Edge, Keys and Remus. In this simulation, each company was able to produce and sell two products in each of three countries; Japan, the United States and West Germany, each country having its own income tax rates, economic fluctuations, etc. Products could be shipped between countries with *fixed* and equal transportation charges, but no tariffs. Capital was able to flow freely between countries, but the exchange rates between the currencies changed with every iteration. Interest rates were a function of the country in which funds are borrowed and the credit worthiness of the operations in that country. Response to research and development expenditures (R&D), the demand for products and the costs of manufacturing varied between countries. While borrowing could take place in any country, additional equity could only be raised in the United States. There were major equity holdings in all three countries. A maximum of 87 decisions had to be made for every iteration.

The competition attracted 26 college teams ranging from Hawaii to New York and from Oregon to Florida. The teams were divided into four groups or industries and the contest was conducted in two rounds. The first set of decisions were due on January 19, 1986. A trial run was conducted in which teams submitted a set of decisions and received the results in order to have some knowledge of how the simulation worked. These results were disregarded. Eight subsequent decision periods were run, starting with the same competitive structure as in the trial run. A strategy paper and a revised strategy paper were required from each team during the eight periods of play. Industry winners were selected from each of the four industries or groups to compete in the second and final round of play. In the second round, these four industry winners completed six decision periods. The final two decisions were made in Savannah, Georgia, on April 18 & 19. A panel of qualified judges selected Georgia Tech's team as the winner based on the team's performance over the six decision periods and on a 30 minute presentation describing the firm's strategy, decision rules and the team's general knowledge about the economic interactions and the quasi-social implications of the game.

FORMING THE TEAM

A special 3 quarter hour course was established under the rubric of "*Special Topics*" and the enrollment was *by permission of the instructor only*. A single page description of the upcoming competition was distributed to the undergraduate management students. If a student was interested, he or she was interviewed by the advisor. This procedure was established in order to limit the

size of the course and to make sure all participants had some previous course work in the functional areas of management and possessed rudimentary microcomputer skills. However, only five students applied for the course, so they were all accepted. Three seniors and two juniors comprised the class. Four of these students had previously participated in Marketing in Action, a simulation game used in a marketing course regularly taught by the advisor and the fifth student was concurrently taking this course. The fifth student had previously participated in Marketing Simulation by Bush and Brobst as well as The Business Management Laboratory by Jensen and Cherrington. During the first class session the time for all subsequent meetings was set at 7 to 12 pm on Thursdays and 10 am to 2 pm on Sundays. After this schedule was announced, one of the seniors dropped out. The fourth potential team member withdrew prior to the final round of competition.

Through the "luck of the sign-up procedure", the final three members all brought different skills and different personalities to the team to form a successful and unique threesome. This combination of skills was similar to the original concept behind the development of Operations Research, where an interdisciplinary approach created problem solving techniques that would never have been considered by a single school of thought. In the team's case, Gary, whose spontaneity and high energy level always lasted throughout the long hours, was considered the PC guru by his team-mates. He was constantly conjuring up new graphic illustrations and spreadsheets that added clarity and insight to the decision making process. He was confident in his abilities, as was evident in the question he posed to a judge, "Can you understand my analysis?" Michelle had the creativity and imagination to look beyond the obvious and kept the team focused on the long range objective, that of winning the contest. She also brought the literary skills to convert the sometimes random and irrational activities into fluid reports. Jack was a calm and logical manager, getting the others out of bouts of lethargy and acting as a forceful mediator whenever conflict arose. Although not always peacefully, the three team members worked together to form an effective team and subsequently, lasting friendships.

THE ROLE OF THE ADVISOR

The advisor, especially in this competitive event, walked a very fine line. The decision was made that direct suggestions, advice and the pointing out of errors in logic would be beyond his scope of duties. The advisor played the difficult role of a facilitator. Frequently heard comments from the advisor included, "Show me where the data says that"; "Why do you think so?"; "How will that affect cash flow?"; "What are the effects of that decision on marginal cost?"; "How will that affect both the firms demand and the industry's demand for the product?" and "How will or can your competitors react?" Occasionally he suggested types of software and/or statistical techniques that would answer some of the team's analytical questions. The other role was that of a moderator, settling arguments by requiring proof and logic for the disputed positions and views.

INFORMATIONAL TOOLS

The primary tool for analysis and information display was Lotus 1-2-3 Release 2. The students developed a spreadsheet and presented it to the advisor for a critique. The advisor made suggestions for its improvement and provided some assistance in programming, when requested. The primary spreadsheet was comprised of 3 parts: one for each country, with 2 sections in each part. These 2 sections were identical except that one section

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reported information in the local currency and the second section would report the results in any country's currency whenever the appropriate exchange rates were entered. Each section was approximately 400 lines long with each period of play using a separate column. Every bit of data provided on the output sheets after each period's run was keyboarded into these primary sheets. A consolidated sheet was developed which contained data on demand oriented variables from all three countries and competitive information from all competitors. Extensive use was made of the regression model in LOTUS. The graphics capabilities were useful in explaining and defending decision rules that team members recommended to the group.

GENERAL DECISION STRATEGIES

The overall strategy was a rather simple one and was based on a small set of assumptions. These assumptions were: 1) The company is a Multinational firm with major numbers of stock holders in all the countries where the products were either manufactured or sold. 2) Maximizing the discounted cash flow over the duration of the simulation would maximize the benefits to the owners, both in the stock value at the end of play and the total amount of dividends received over the duration of play. Since the stockholder base was international, no constraints were imposed regarding national boundaries. Capital would be raised in the least cost markets and transferred to the country which needed it. Production would be shifted to the minimum cost facility, taking into consideration tax rates, transportation charges and potential for changes in the long term exchange rates. Since there was no known way to forecast exchange rates other than comparing the rates in the game to rates in the real market, real market rate changes were investigated and used as input to the decision making process. It was concluded that although the value of the dollar was falling rapidly, it would not deteriorate enough in the real market during the two months of the simulation to drastically affect the outcome of the game. While the rate changes were logged and their effects traced, drastic changes to the basic structure of the foreign exchange markets were never considered. It was assumed that the team's management task was to understand the environment in which the simulated businesses operated and manage its resources to maximize the stockholders' benefits. The simulation has the explicit assumption of efficient capital markets. It was assumed that the manufacturing facilities were located in a major metropolitan area and that an efficient labor market existed. Any layoffs of factory workers due to shifting manufacturing facilities to other countries would be absorbed by other firms in the same general location. Any increases in employment could be accomplished by hiring workers away from other local firms. A single manufacturing facility of the size suggested by the book value of Plant and Equipment in a country was assumed not to produce any noticeable impact on employment in the local markets. If that were not the case, finding new employees for major plant expansion would have been a problem.

THE DECISION PROCESS

Three of the team members were each assigned a country to manage and the fourth was assigned the task of tracking and forecasting the international financial situation. The students were to analyze the data pertinent to their sphere of influence and bring recommendations to the group meeting. All recommended decisions were supported by both reason and data. Where useful, graphic presentations were made to the other members of the team. The team then tried to reach a consensus on the set of decisions. If this failed, a majority rule was substituted. The majority rule was invoked frequently.

For the three members of the team, the analysis and presentation routine worked well. However, the fourth teammate could never bring himself to use data and analysis to support his recommendations. His constant plea was "Trust me". To be honest, this team member provided a lot of insight and many of his recommendations were accepted and proved to be effective, but when the group voted against his recommendations, he became very upset. The degree of his discontent was not evident until the end of round one, when he would not complete his portion of the revised strategy paper. He claimed that he had completed and

mailed it to GSC, but subsequent checking proved that they had never received it. This called for some fast writing and the burning of midnight oil on the part of the rest of the team to provide the necessary documentation. Upon close examination of the output reports, especially the decisions section, the team noticed several discrepancies between the decision forms which were used to call in the decisions and the output statements. The team originally attributed this to errors in recording the data on the spreadsheets. The team did not go back to the actual decision forms and check the data during the competition. The actual decisions bore very close resemblance to the decisions this individual initially wanted but was overridden by the others on the team. It was discovered that the student was calling in changes after the team had reported their preferred decisions by telephone to GSC. These altered decisions reduced the profits of the team by substantial amounts. The three members expressed their gratitude to the student and recommended that he not appear with them for their final competitive round.

THE RESULTS

The team would like to claim that the proof of the pudding of winning was in their firm's financial and market position at the end of both rounds of competition. At the end of round 1, the regional competition, our team had 67 percent more assets than the nearest competitor and no long term debt. The firm had paid two and a half times the dividends of the firm paying the next highest amount of dividends. The firm also had the greatest amount of cash on hand. This was accomplished with market shares of over 20 percent in product 1 and just under 15 percent in product 2 in a seven company industry. At the end of the final round, our team again had the largest asset base, and out performed the second place team in Return on Investment, 54.3% to 21.7%; in Return on Assets, 17.1% to 10.3%; dollar market share, 28.2% to 18.9% (although the firm holding the second largest dollar market share held 26.8%); and finally our team's accumulated profits were \$198,398 compared to the nearest competitor's profits of \$ 100,922.

THE PRESENTATION

After the final or sixth round, the team made a presentation to a panel of judges. This presentation was done with the aid of flip charts and overhead transparencies provided at the site and a PC Storyboard™ presentation utilizing an IBM AT which the team members brought along to assist in the final plays of the simulation as well as in the presentation. Many of the slides for the presentation were made up prior to the last two iterations with space left to input the added results. It was the strategy to use all three media to present the team's understanding of how the simulated environment reacted through the vast array of decisions that needed to be made. Since the final round was a set of six decision periods of the same simulation used in the regional competition, substantial information from the preliminary round was used in the presentation materials.

ISSUES IN JUDGING

The experience the team had in the judging process was interesting. The team did not know the basis on which it was being judged. It was assumed that most of the questions would be to insure that the decision making had been on the basis of analysis and knowledge and not luck. When the judges were faced after the presentation, several questions were fielded regarding the social consequences of removing the total manufacturing facilities from a country. It was felt that the judges "deducted points" from the team's standing because of an apparent lack of societal concern. The societal concern was not a part of the simulation itself. If the human element was to be considered important then it should have been incorporated in the game environment itself and not left as an afterthought of the judges. The presentation team felt that this issue put the team in a no-win situation. It was a contest and not the real world. If substantial concern had been shown toward an assumed human element regarding the distress of a plant shut down, the gauges of misfortune would have played a much more important role in selecting the regional winners. The team assumed that the goal was to perform in the best way possible

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within the given environment. Inc human element of the game environment was considered by the penalties associated with dismissing workers. The team members were quite ready to be questioned on the wisdom of that decision based on the risks that currency fluctuation would have caused.

OBSERVED MINOR GLITCHES

Upon receipt of the initial output, one of the team members noticed that the replacement value of the plant and equipment was less than its cash value in all three countries. Thus, selling a plant and rebuilding it generated cash (but no profits) which could be used by the company in any way the managers wished. In addition, stock manipulation could take place if the team members had faith in their ability to turn the operation around. If losses were produced and extensive loans were taken out the first period, it was assumed that the stock price would fall. Cash, although expensive, could always be raised. Therefore, a large block of treasury stock was purchased in the second period with the intent of selling it in the second year and generating large positive cash flows. Here again, this procedure gained cash but not profits, but the strategy was to maximize cash flows. Another observation was that the economic indices of the three countries were really only one index lagged one period for the first country and two periods for the third. By the last period, its periodicity could be approximated.

REALLY

All three of the above noted glitches would not hold in the real world. The salvage value of a plant would not be above its replacement value. Stock market manipulation and the use of insider information is blatantly illegal in the real world but uncontrollable by the rules of the simulation. The major problem of prevention of manipulation, is knowing the intent of the players. The general economic index of one country is not a simple lagged function of another. The use of three related but not simply lagged indices would have been more realistic.

CONCLUSION

The Multi-national Management Game contains a wide variety of decision variables and complexities. The factors that contributed to the success of the teams were many. Planning, the use of informational tools, specific decision rules, group dynamics and especially long and hard work. As team members, we were challenged, educated and even entertained through our participation in the game. It was felt that the game simulated many of the complexities of the world of international competition and the team certainly enjoyed the opportunity to test their skills.

All things considered, this game and competition was exceptionally well run and an enjoyable experience. The hard work of the team over the four months paid off with a fantastic trophy that is on display in the college executive suite. The accommodations for the final rounds of competition were delightful and the team even was able to see a little bit of Savannah. Dr. Keys and his staff deserve a round of applause for their heroic efforts. The management team from Georgia Tech appreciated the opportunity for learning what ABSEL and GSC provided and look forward to meeting with the ABSEL organization in the spring of 1987, in Hilton Head.