Profits: The False Prophet in Business Gaming

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Historically, the profits generated during the course of play by companies in a business simulation have been used as a surrogate measure of the managerial ability of team members. Better measures of managerial ability would be gained by measuring and analyzing errors in forecasting over a wide variety of events. The ability to operate within budget constraints and to allocate limited resources among almost limitless needs is also an indicator of managerial ability. Assigning specific responsibilities to each individual on a team, and then evaluating that individual's effort, allow a grade or performance rating to be assigned to each member of the team. Measuring profit performance requires the limitation that all firms must start as equals. Without this imposing limitation, a much richer simulation environment could be established.

KEYWORDS: *business simulations*; *evaluation*; *performance measurement.*

The vast majority of faculty who use business simulations in the classroom environment seem to evaluate a team's performance based on some function of the profit which the simulated firm has accumulated over the period of play. This may be actual profit, return on equity, return on investment, stock price, inventory turnover, or even market share. Henshaw and Jackson (1978) stated that "although profit is the 'rules of the games' goal within the Executive Game, the player's real objective is, of course, *learning*." The instructor's manual for MICROMATIC (Scott & Strickland, 1985, p. 8.) states that the "standing of each team at the end of each quarter and the cumulative standings at the end of the game" will be used to prorate part of the participants' grades. Even functional games, such as the SALES MANAGEMENT SIMULATION (Day & Dalrymple, 1985, p. 7), use "performance as

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reflected by cumulative net profit." In an early study measuring team performance when playing the UCLA game (Starbuck & Kobrow, 1968), the only measure was company profits. Many other articles, too numerous to mention here, refer to "team performance" as a euphemism for cumulative profits over the periods the game had been played.

At first glance, this looks like the correct thing to do. After all, in the *real world*, the executives of firms are evaluated on their ability to generate profits. (For an interesting analysis of the problems of evaluating upper manager productivity, see Judson, 1982.) However, if one looks carefully at the evidence, there are very few examples that support this hypothesis. Intercompany comparisons of executives and their managerial capabilities based on the profitability of, say, IBM and Digital Equipment Corporation or Coca-Cola USA and Pepsico are hardly even considered. This is not to say that companies' performances are not compared for investment purposes—they are. But the conclusion that the differences are due to the abilities of the management team has rarely been drawn. This author has never heard of an executive's performance being measured using company-by-company profit comparisons. Yet intercompany comparisons are regularly used to evaluate the quality of the managerial decisions in business simulations. Scott and Strickland's (1985) instructor's manual for MICROMATIC recommends that as much as 40% of a student's grade be assigned on the basis of *performance* (p. 6). Schellenberger and Masters' MANSYM IV produces an evaluation based on return on equity and measures of internal performance. The weight assigned to each factor is set by the instructor (Schellenberger & Masters, 1986, pp. 66-71). Evaluations using an instructor-weighted, machine-scoring technique based on ROI, market share, financial ratios, and so on is provided by THE BUSINESS GAME (Mills & McDowell, 1985). All of these measures compare the performance of one firm on these variables directly to the performance of the other firms.

Previous Studies

A great deal of research has been done to explain why some simulation teams perform better than others. Ten years after the introduction of management decision gaming by the American Management Association, Vance and Gray (1967) published research on the measurement of performance. They asserted that performance in a management simulation, if properly validated, could be used to predict academic success or to appraise managerial potential. Their measure of performance was "similar to those used by stock market

analysts – growth, profit, dividends, etc." Of the six factors making up these authors' performance measures, all but one, inventory performance, was highly correlated with profit per period. While these authors recognized that the human skills were excluded by these strictly financial measures, they did not attempt to measure the human elements.

Hand and Sims (1975) used path analysis to investigate business simulation performance relationships in the INTOP (Thorelli & Graves, 1964) game. Hand and Sims reported that of the 13 performance variables tested by their study, only two were necessary for further research. Those were sales forecasting error, and profit. They went on to conclude:

> Teams that forecast well also have higher profits. One interpretation of this finding would be the development of specific analytic capabilities (forecasting the future) concurrently generates capabilities associated with effective management of the total simulated firm. The emphasis on forecasting in a gaming simulation appears to be warranted.

Biggs (1987) used objective, quantitative output measures and subjective, qualitative measures such as peer rankings, reports, and other nonfinancial criteria as performance measures to develop grading algorithms for business simulation participants. In his article, a table of suggested performance evaluation criteria for 12 competitive business simulations was presented. In all 12 cases, profit, or a derivative of profit, was the suggested measure of performance. In concluding, Biggs reported, "The results also indicate that reliance on mechanically generated scores can lead to questionable grading practices. . . . Decisions need to be evaluated along with performance measures" (p. 198).

A study of the influence of qualitative training on game performance (Niebuhr & Norris, 1980) reported that students with qualitative majors out-performed nonqualitative students only under special circumstances. In this study, the performance measure was the average rate of return, and since the assets of all the firms were identical at the start, the performance was cumulative profit.

Thus, in study after study, attempts at explaining performance have had no consistent results. Wolfe (1978) concluded that these mixed results may be attributed to the fact that academic success is an individual measure, while game performance is the result of group or team decision making. This article hypothesizes that the problem is not the the way in which decisions are made, but that the wrong dependant variable has been used.

Variable Problems

At the 1986 Association for Business Simulation and Experiential Learning meeting, one session came to the conclusion that profits, or their derivatives, were the best, if not the only, valid criterion to evaluate business simulation performance. The use of profits was seen as making the competition between teams more like the real world. It was claimed that top managers are judged on their abilities to generate bottom-line profits, and students should face the same evaluation criterion in business simulations. Not only was profit considered to be the best indicator of performance, the session concluded, but it is reported after every play for every team and thus, it is easy to find. The profit data provide direct measures of the rank order of performance and direct comparisons can be made among and between the competing teams. There were, however, a few in the audience with dissenting views.

This article presents a different view. It is not that the bottom-line profit figure is unimportant, but that the time period over which profits are accumulated in most business simulations is too short to use profits to provide an adequate measure of managerial ability. Determining large portions of a student's grade, based on short-term profit measures, emphasizes the view that management has a very short horizon. This emphasis on profits encourages the short-term perspective, even though this is widely held to be counterproductive in the long run (Hayes & Abernathey, 1980). While this trait of evaluation, based on short-term measures of profitability, may actually exist in the world of U. S. business, it is not one that should be fostered in the minds and habits of young managers. But more important, the utilization of profits as an evaluation tool creates too many obstacles and obstructions realistic simulation design and play. Many rapidly expanding firms have much more difficulty with cash flows than with profits in both real and simulated scenarios. Short-term tactics may negatively affect short-term profits but lead to a very strong long-term position. The tactic of buying market share early in product development and commercialization has proven to have long-run benefits to many actual firms (Buzzell & Wiersma, 1981; Headley, 1976; Schoeffer, Buzzell, & Heany, 1974; also see many of the PIMS studies published by Strategic Planning, Cambridge, MA).

Many simulation authors stress that their games "utilize general relationships that might exist in any competitive industry" (Edge, Keys, & Remus, 1985, p. 1). Other authors want to "keep the environment relevant" (Jensen

& Cherrington, 1984, p. iv). Still another claims that "through simulation you will get as close to actual business experience – at the decision-making level – as you possibly can without leaving the classroom" (Bush & Brobst, 1979, p. 1).

Despite these claims, all of the above (and the vast majority of other business simulations) develop a scenario in which all firms are identically equal. Why are they all equal? If profits and other financial comparisons are used for evaluations, then no firm is allowed to have an advantage. If one firm in the simulation had a superior product, or more cash, or an advantage in manufacturing, technology would be more profitable because of this advantage (assuming ceteris paribus conditions). Changes in advantage after the beginning of the game are currently assumed to be the result of careful and strategic planning, not dumb luck. This author has never found a situation where the executives of firms make decisions in an environment of total equality between companies. The use of direct comparisons of profits between simulated firms have produced some strange and counterproductive decision making on the part of some teams. Desperation plays, such as charging an astronomical price for a product and hoping to sell at least a few, is but one example. End-plays, such as cutting all R&D or ordering no raw materials in the last period, is another typical move. All of these decisions create unrealistic results and suggest that decisions detrimental to the firm may be appropriate when a good evaluation of a team or manager is at stake.

Situations of decision making under conditions of total equality never exist in reality and tend to simplify simulations in a way that distracts and misguides decision makers. The goal should be on developing decision rules that can be generalized and applied in many new and different applications. Emphasizing short-term and comparable profits detracts from participants taking a long-term view of the firm. The firm must survive and compete over many years, whether or not the current crop of managers remain with the firm. Producing short-term profits at the expense of appropriate long-term commitments has ruined many a firm in the real world. Why set student managers on this very course?

Business schools have recently been criticized in both the business and popular presses because their graduates are too short-sighted or are interested in their own progress at the expense of the firms that they manage. It has been stated that the Japanese are overtaking the Americans because of a failure of managers to take the long-run view. Leontief (1982) reported that, in the 10 years between 1970 and 1980, "U.S. firms earned an eighteen percent return on their investment while the Japanese counterparts earned only eleven percent, but invested heavily in the future." These high rates of return can only be obtained if firms sacrifice long-run investments. At a 25% discount

rate, a dollar to be received in 20 years is only worth an investment of one cent (Hayes & Garvin, 1982).

Masahiko Aoki (1987, p. 264) found that the neoclassic, profit-maximization postulate has not fit the Japanese economic models. He hypothesized that "the modern corporate firm is not a simple entity maximizing a single objective such as its share price." Drucker (1974, p. 114) pointed out that "profit planning is necessary. But it is planning for a needed minimum profitability rather than the meaningless shibboleth 'profit maximization.'" Yang (1984) concluded that "American firms may wish to adopt a modified form of Japanese-style vision setting" as a response for how U.S. firms could better compete with the Japanese. The Japanese are persistent and are less short-term profit oriented. Sony's Mr. Miyaoka (a research engineer) said, "If a foreign [meaning U.S. or European] company's research doesn't bear fruit in a few years' time, they put it on the shelf. But Sony is very persistent" (Browning, 1986). (For an in-depth review of the comparisons between American and Japanese management styles, see Tsurumi, 1984.)

It is claimed that business school graduates, in general, and MBAs in particular, look only for short-term gains. They will not take long-term gambles on new products or innovations because they receive promotions and pay raises based on short-run successes (see the cover story in *Business Week*, March 24, 1986, "Remaking the Harvard B-School"). The October 11, 1985, *Wall Street Journal* noted that "MBAs . . . emphasize the short run." The fact that graduate business education puts an overemphasis on the short-term was highlighted when a survey of the *Fortune 500* presidents revealed that 45% of them thought that MBA programs should de-emphasize short-term decision making and evaluation (Jenkins, Reizenstein, & Rogers, 1984). Even business school deans recognize this short-term view of their graduates. Two associate deans from the University of North Carolina at Chapel Hill reported that "schools give MBAs and PhDs insufficient preparation for a long-term point of view" (Behrman & Levin, 1984).

The emphasis is on sure bets. The hue and cry seems to be: If American industry is to prosper in the face of strong international competition, managers must stress strategic planning and look for long-run successes, not just short-term profits and the personal acclaim that instant, or sure, success brings. Evaluating students who participate in business games on the basis of cumulative profits over a designated number of plays, typically 8 to 16 simulated periods, emphasizes the short-term perspective and does not provide incentives for long-term planning. All the players know how each team is doing according to reported profits. Frequently, professors even point out which teams are *winning*, based on short-term cumulative profits as an

incentive for the student managers to do a better job and to "win this one for the Gipper." This emphasis on short-term profits is easily interpreted by students to be the best tool for evaluation. After all, the professor emphasizes it. Thus, in evaluating business simulation results in the way that they do, the faculty provide the business school critics with their best ammunition.

Because business simulations are frequently evaluated on profits or profit derivatives, games have been designated to insure that assets, liabilities, market potential, and cost structures are equal across all firms at the start of the game. Substantial care is taken in simulation design to give no company or team an advantage in producing profits, except for the assumed managerial ability of its team members. All ensuing profit differentials are then assumed to be the result of superior managerial decision making. This can result in several negative consequences. Sometimes profits are generated solely because of luck. In some cases, a firm would lead the industry in profits until the end of the game and then see its position evaporate due to *end-play* on the part of a competing team. In still other situations, bad decisions on the part of one team affect the profits of other teams in unequal ways.

When has the condition of equality of opportunity and profitability ever been observed in the *real world*? In reality, some firms have more resources than others. Certainly, a General Motors executive should not be compared to one at American Motors on the basis of overall company profits. Some companies have lower labor costs and still others have location advantages. It is the task of managers to manage, in spite of these differences, and to do the most efficient job in the allocation of scarce resources to those uses that produce the most benefits for the firm. In pure economic terms, managers must allocate the firm's resources in a way that will equalize their marginal rates of return across all possible investments. Student managers in simulated environments should face these same realities and recognize their tasks for what they really are. On the job, they will almost never be asked to produce, or be judged, on their ability to produce the highest dollar profits of all the companies in an industry. Firms or plants are never equals. The confounding of fixed cost allocations, the ownership and operation of multiple strategic business units, as well as firms with different product line widths, all make accurate company-to-company comparisons too unreliable on which to base well-thought-out managerial evaluations. Differential advantages exist in all phases of manufacturing and marketing between competitors. Simulations should teach, and students should learn, how to recognize differential advantage and to put their resources where they will yield the most profitable return, even if their alternatives are not as good as a competitor's opportunities. Students must learn how to get "the most bang for their buck" and not feel

cheated if another manager has more opportunity to exploit their firm's particular advantages.

The Excess Baggage of Evaluation by Profits

The inherent assumption of almost all business simulations that I am acquainted with is that some form of short-term profits will be used as an evaluation tool. If this were not the case, then all firms would not "start" with identical financial resources, marketing potentials, and manufacturing facilities. If one were to abandon this constraint, think of all the variations that could be incorporated in a business simulation. Firms high on innovation could compete with more traditional firms. Products in different stages of the product life cycle, competing for the same customers, could provide team members with a vast array of experiences. Firms with inherent manufacturing advantages could compete with firms that have marketing advantages. Different manufacturers could have different experience curves and efficiencies of production. Some firms could be phasing old products out of the marketplace as other firms are introducing new and innovative ones to the market. The list of changes that would make gaming more realistic is almost endless.

The underlying pseudo-requirement of using profitability as an evaluation tool also carries the necessity of starting all firms from an equal position. This equal-opportunity necessity dooms simulations which are evaluated on the basis of profitability to situations that are over-simplistic and not reflective of reality. Wouldn't it be nice to have a game where one firm has a new manufacturing facility with its higher technology and more efficient throughput, including the bugs that come from new technology, and a competing firm which has only antiquated equipment. Another firm in the same simulation could have higher transportation costs, due to being located in a different geographical area, but also have lower labor costs. The ability to incorporate these features under the equal opportunity assumption needed for basing the evaluation of teams accumulated profits is almost, if not, impossible.

Other Problems with Profits

One of the tenets or proper evaluation methods is that the person or team being evaluated should be evaluated on the basis of controllable variables or the decisions they make and not on externalities (Landward & Farr, 1980; O'Conner, 1984). It is not infrequent in simulations that errors in decision

making by one team affect the profitability of another team. One team may under- or overprice a product so much that every other firm in the industry has its profits affected, some more so than others. Another scenario, which all faculty who use business simulation have faced, is where a particular bad or erroneous decision has affected the profits of a firm for the entire time over which the simulation is played. While these, or similar events, may take place in the drama of real life, their occurrence in a game does not encourage the best efforts on the part of the participants or concentration on the best decision-making processes in the simulated environment.

An additional problem of using profits as a means of evaluation and reward is that it is very difficult to assign a different grade to the different members of a team. Several schemes have been suggested by various simulation authors. Peer evaluations are suggested in THE EXECUTIVE SIMULATION (Keys & Leftwich, 1985, p. 5). Dividing the net assets among the players by each team member is encouraged in the instructor's manual for MARKETING IN ACTION (Ness & Day, 1984, p. 10). Some authors even devise an elaborate system of converting *ending chips* into points, which are allocated to the individual members as rewards for their efforts (Thavikulwat, 1983, p. 34). Most of these methods can be summarized as ones in which each of the players parcels out the earnings of the simulated firm to every player in some proportion that relates to the effort that each member has contributed to the group. However, group cohesion, Greek organization membership, power plays, and even outright prejudice can, and do, sway these allocations.

If Not Profits, What Can Be Used for Evaluation?

In order to operate all business simulations, the participants must forecast events, order materials, and create budgets and pro forma financial statements. Since these are produced as working documents by the players, why not convert these into evaluation instruments? If one team is able to forecast accurately direct manufacturing costs, inventory levels, market shares, and sales, along with the need for cash, it would be asserted that their firm would be better managed than the firm of a team which was not as good at forecasting. Note that these measures do not require any equality of assets, efficiency, and/or marketability of their products among the competing firms. Errors in forecasting and estimating could be measured in either absolute or relative terms. If relative or percentage error measures are used, it must be recalled that they are not symmetrical. The lower bound is zero, negative

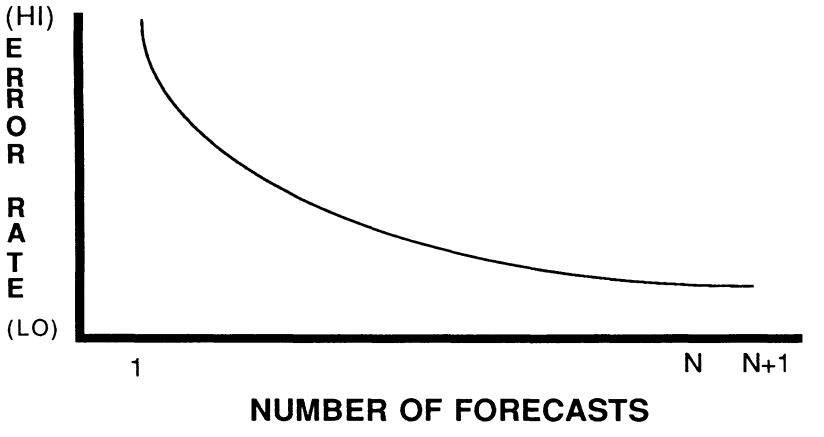

Figure 1. Expected forecasting errors versus the number of forecasts.

errors are not defined, but no upper bound exists. The inclusion of measures, based on errors in forecasting, would direct students into looking for solutions by doing economic analysis at the margin, a skill one expects business and economic students to learn while in college.

Since forecasting is a learned skill, one would expect the students to get better with practice. That is, as the simulation progresses through time, the teams get better at forecasting their expected results. Figure 1 shows the theoretical relationship between the number of attempts at forecasting and the forecasting errors.

The concept of using forecasting ability as a surrogate measure for managerial ability is not entirely a new idea. Anderson and Lawton's (1988) research concentrated on assessing performance in business gaming. In one section of their article, they discussed the possibility of using the "ability to predict" as a measure of performance evaluation. They stated that

> in a competitive business simulation, accurately forecasting market share, profit as a percentage of sales, and ROI reflects a team's ability to translate its decisions into simulation outputs in the midst of a dynamic environment. Without this ability, efforts by the team to plan its future activities are of little value. (p. 242)

Business simulations could be developed where budgeting would play a major role in the management of the enterprise. In these simulations, the estimates and forecasts would provide the basis for establishing budgets for

the operating divisions or departments. Errors in forecasting in these situations would have a very detrimental affect on operations since the budgets are directly tied to the forecasts. If each member of the management team were evaluated on the basis of their individual accuracy, the negotiations between team members needed to revise budgets would add a great deal to both the complexity and the authenticity of business games.

Some Examples

The procedure of providing forecasts and estimates as a regular part of the decision-making processes does not require a totally new generation of business simulations. If a game provides terminal or microcomputer input to a decision module, another set of interactive questions regarding forecasts and expected outcomes could be added to the decision-input module. If paper decision forms are used, a few additional lines are all that need to be added. The additions of forecasts and estimates do not alter or change the basic algorithms of the simulations. The only calculations which need to be added would be those to provide the differences between the actual performance of the firm, division, or department and the forecasted values estimated by the participants. Newer games can incorporate more involved procedures as they are developed. In fact, MICROMATIC (Scott & Strickland, 1985) has a forecasting unit built in and produces pro forma statements based on the participant-supplied forecasts. However, the authors ignore the accuracy of these forecasts when they describe the team evaluation methodology (p. 79).

Requiring participants to estimate sales in units and the expected market share of each product in the firm's product line provides an explicit tool for evaluation of the quality of the marketing decisions. The estimate of sales requires that the person responsible understand the interaction of those variables which determine a firm's sales. An estimate of the total market share requires an understanding of how the decisions of one firm affect the total industry demand of a product. This procedure of obtaining and evaluating forecasts requires that the participants consider how changes in both their own and their competitors' marketing expenditures will affect their firm's sales, as well as the total industry's sales. Dollars spent on advertising should be directly compared to estimates of how it will affect sales, both in the short-term as well as in the long-run.

Manufacturing is less dependent on competitive pressures from other firms, but manufacturing must still service marketing's need for products to sell. In manufacturing, estimates of the cost per unit produced, raw material inventories at the end of each period, and (possibly) the amount of down time

expected on the assembly line over each simulated time period could be required. Students in the top management or finance roles could provide estimates of cash flow, the expected cost of capital, and interest rates, and possibly establish budgets for marketing and manufacturing.

The requirement that simulation participants provide forecasts has two important implications. There is no need for equality of starting positions or equal opportunity among firms. In addition, each team can be broken down into its individual members or into subsets of players for evaluation as long as they are each assigned an identifiable task of providing forecasts or estimates pertinent to their area of responsibility. The assignment of participants to areas of responsibility could be rotated among the members of a team by the instructor or game administrator in order to provide a variety of experiences. Each such assignment could be evaluated. In addition, the individual evaluations could take place every decision period. If the instructor wished, he or she could still evaluate the team as a whole, based on some aggregation of errors across functions, and allow the assignment of individuals to areas of responsibility to be made by the team itself.

The hypothesis of the proposition presented in this article can be put simply. If a team is able to analyze the environment, anticipate competitive actions, determine their own decisions, and, from this milieu, accurately forecast the outcomes, they are good managers. The better the ability of the management team to forecast, the better managers they are. While the relationship between forecasting ability and managerial ability is not expected to be linear, it is expected to be direct. Figure 2 depicts this relationship.

Conclusions

The use of errors in forecasting as evaluation criteria for managerial decision making should improve the quality and realism of decision making in business simulations. The only assumption that must be made is that better forecasting is generally indicative of better management. The requirement of forecasting would direct participants to examine closely the marginal results of decisions and lessen the tendency to grope about for easy answers to complex problems. Small short-term gains will not be preferred to larger, but more stochastic, long-term gains. In addition, the use of error measurements frees simulations from the requirement that all firms must have equal assets, liabilities, and opportunities. A rich environment of differences between firms will provide more realism and direct decision making toward long-term, economically viable alternatives.

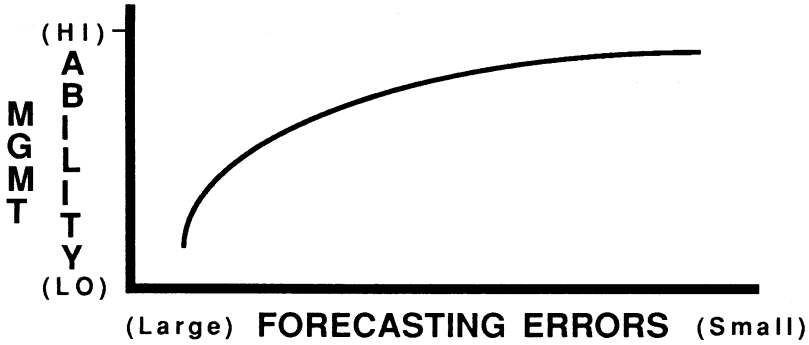

Figure 2. The relationship between forecasting and managerial abilities.

References

Anderson, P., & Lawton, L. (1988). Assessing student performance on a business simulation exercise. In P. Sanders & T. Pray (Eds.), *Developments in business simulation and experiential exercises* (Vol. 15, pp. 241-245). Stillwater: Oklahoma State University Press.

Aoki, M. (1987). The Japanese firm in transition. In K. Yamamura & Y. Yasuba (Eds.), *The political economy of Japan: Vol. 1. The domestic transformation* (pp. 263-288). Palo Alto, CA: Stanford University Press.

Behrman, J., & Levin, R. (1984). Are business schools doing their job? *Harvard Business Review, 62*(1), 140-147.

Biggs, W. (1987). A comparison of ranking and relational grading procedures in a general management simulation. *Simulation & Games, 9*(2), 185-200.

Browning, E. (1986, February 27). Japanese triumph: Perseverance helped Sony in the mini-CD players. *Wall Street Journal*, Sec. 1, p. 1.

Bush, R., & Brobst, R. (1979). *Marketing simulation*. New York: Harper & Row.

Buzzell, R., & Wiersma, F. (1981). Successful share-building strategies. *Harvard Business Review, 59*(1), 135-137.

Day, R., & Dalrymple, D. (1985). *SALES MANAGEMENT SIMULATION*. New York: Wiley.

Drucker, P. (1974). *Management: Tasks, responsibilities, practices*. New York: Harper & Row.

Edge, A., Keys, B., & Remus, W. (1985). *THE MULTINATIONAL MANAGEMENT GAME* (2nd ed.). Plano, TX: Business Publications, Inc.

Hand, H., & Sims, H., Jr. (1975). Statistical evaluation of complex gaming performance. *Management Science, 21*(6), 708-717.

Hayes, R., & Abernathey, W. (1980). Managing our way to economic decline. *Harvard Business Review, 58*(5), 72-73.

Hayes, R., & Garvin, D. (1982). Managing tomorrow as if it mattered. *Harvard Business Review, 60*(3), 70-79.

Headley, B. (1976). A fundamental approach to strategy development. *Long Range Planning*, No. 4, 8-9.

Henshaw, R., & Jackson, J. (1978). *THE EXECUTIVE GAME.* Homewood, IL: Richard D. Irwin, Inc.

Jenkins, R., Reizenstein, R., & Rogers, F. (1984). Report cards on the MBA. *Harvard Business Review*, *62*(5), 20-30.

Jensen, R., & Cherrington, D. (1984). *THE BUSINESS MANAGEMENT LABORATORY* (3rd ed.). Plano, TX: Business Publications, Inc.

Judson, A. (1982). The awkward truth about productivity. *Harvard Business Review*, *60*(4), 93-97.

Keys, B., & Leftwich, H. (1985). *THE EXECUTIVE SIMULATION* (3rd ed.). New York: Kendall/Hunt.

Landward, F., & Farr, J. (1980). Performance rating. *Psychology Bulletin, 87*(1), 72-107.

Leontief, W. (1982, August 12). What hope for the economy? *New York Review*, p. 31.

Mills, L., & McDowell, D. (1985). *THE BUSINESS GAME*. Boston: Little, Brown.

Niebuhr, R., & Norris, D. (1980). Gaming performance: The influence of quantitative training and environmental conditions. *Journal of Experiential Learning and Simulation*, *2*(1), 65-73.

Ness, T., & Day, R. (1984). *Instructor's manual to accompany MARKETING IN ACTION* (5th ed.). Homewood, IL: Richard D. Irwin, Inc.

O'Conner, E. (1984). Situational constraint effects on performance, affective reactions, and turnover: A field replication and extension. *Journal of Applied Psychology, 69*(4), 663-676.

Schellenberger, R., & Masters, L. (1986). *MANSYM IV: A dynamic management simulator with decision support systems*. New York: Wiley.

Schoeffer, S., Buzzell, R., & Heany, D. (1974). Impact of strategic planning on profit performance. *Harvard Business Review*, *52*(2), 137-139.

Scott, T., & Strickland A., III. (1985). *Instructor's manual for MICROMATIC: A management simulation*. Boston: Houghton Mifflin.

Starbuck, W., & Kobrow, E. (1968). The effects of advisors on team performance. In S. Sarane, S. Bobcock, & E. Schild (Eds.), *Simulation games in learning* (pp. 232-239). Beverly Hills, CA: Sage.

Thorelli, H., & Graves, R. (1964). *International operations simulation.* New York: Free Press.

Thavikulwat, P. (1983). *Instructor's manual to accompany BLOCKS & CHIPS: An entrepreneurial game*. Published by Dept. of Management, University of North Dakota.

Tsurumi, Y. (1984). Comparisons of American and Japanese corporate culture. In *Multinational management: Business strategy and government policy* (2nd ed., chap. 11, pp. 281-309). Cambridge, MA: Ballinger.

Vance, S., & Gray, C. (1967). Use of a performance evaluation model for research in business gaming. *Academy of Management Journal*, *33*(1), 27-37.

Wolfe, J. (1978). Correlations between academic achievement, aptitude and business game performance. In *Exploring experiential learning: Simulations and experiential exercises* (pp. 316-324). Proceedings of the Fifth National ABSEL Conference.

Yang, C. (1984). Demystifying Japanese management practices. *Harvard Business Review*, *62*(6), 4-8.

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