

REVISITING STRATEGY LEARNING IN A TOTAL ENTERPRISE SIMULATION

Alan L. Patz

University of Southern California

alanpatz@mac.com

ABSTRACT

The learning benefits of a specific total enterprise (TE) simulation are determined by what knowledge bases are chosen and not chosen for a simulation's design. Repeating an earlier study of THE BUSINESS STRATEGY GAME on its new edition shows this. As before, the learning of and attention to strategy ratings led to superior and large performance differences between winning, first place teams, and losing, last place teams. Other variables such as prices do not matter. The ones that do are broad or focused product line, quality, service, brand image, low cost, market share leadership, superior value, and global or focused coverage. This sort of TE simulation result is a considerable asset in defining what is learned using a specific simulation and suggesting dimensions for other designs.

INTRODUCTION

Results of a recent study (Patz, 2002) of THE BUSINESS STRATEGY GAME (Thompson & Stappenbeck, 1999), show that the learning of and attention to strategy ratings led to superior and large performance differences between winning, first place teams, and losing, last place ones. Other variables, such as price, do not matter. The ones that do—and form the basis of an eight-point strategy rating system—are broad or focused product line, quality, service, brand image, low cost, market share leadership, superior value, and global or focused coverage.

This particular total enterprise (TE) simulation is concerned with manufacturing and marketing of athletic shoes—both branded and private label—using US dollars, Eurodollars, and Japanese yen in North America, Europe, and Asia respectively. In addition to a strategy rating, each competing team is measured on five other dimensions. They are sales revenue, after tax earnings, return on equity, bond rating, and company value.

A later edition of this TE simulation (Thompson & Stappenbeck, 2001) adds several new components. Key ones are internet marketing and online sales, Latin America as a new geographic region, an option to open a chain of company owned retail stores, revised initial plant capacities, and restrictions on plant capacity expansions when forecasted worldwide demand is 25 to 50% below

worldwide production potential. The Brazilian real is the Latin America currency.

These additions raise the question of whether or not participant learning of and attention to the strategy rating system will lead to the same results. This is important, paraphrasing Goosen, Jensen, & Wells (2001), because the learning benefits of a specific simulation are determined by what knowledge bases are chosen and not chosen for the simulation's design.

The previous test of THE BUSINESS STRATEGY GAME indicates that strategy learning is of paramount importance. Does that result continue in the new design?

HYPOTHESES

Therefore, continuing the strategy learning focus of the previous study, the same hypotheses apply using the standard equation $\pi = pq - c(q)$. As before, π = profit, p = price, q = quantity sold, and $c(q)$ = cost of manufacturing and marketing. Each hypothesis refers to a comparison between first place and last place firms (winners and losers, or **W** and **L**).

H1: Price is not an important **W** and **L** distinction.

H2: **W** firms will experience higher quantity demands than **L** firms.

H3: **W** firms will have lower unit manufacturing costs than **L** firms.

H4: **W** firms will have lower unit marketing costs than **L** firms,

Most important is the strategy dimension:

H5: **W** firms strategy ratings will exceed those of **L** firms.

Of course, the first test will be whether or not the performance ratings of **W** firms exceed those of **L** firms. This consideration is obvious and will be the first result presented.

METHOD

A TE simulation was conducted in 6 sections of an undergraduate, capstone policy course over a period of 6 semesters. Each section formed an independent industry, and a total of 261 students participated. All students were

Developments in Business Simulation and Experiential Learning, Volume 30, 2003

seniors majoring in the various fields of business administration.

After one class session devoted to the clarification of simulation rules, evaluation procedures, and decision making mechanics, a two-year practice decision sequence was completed. Questions pertaining to the results of each session were answered and the evaluation procedure was restated. That is, students were reminded that the cumulative scores at the end of the simulation were the figures of merit.

The importance placed on ending cumulative scores rather than current period results emphasizes long- rather than short-term strategies. Moreover, attention was directed to three specific conditions. First, the actual ending period of the simulation would remain unknown. (Each period is a year in THE BUSINESS STRATEGY GAME, and the length of the semester allowed for a maximum of ten periods of play.) Second, all teams were expected to end their management tenure with a going concern, not a firm stripped of long term potential in order to gain short-term ranking enhancements. Third, 20% of the semester grade for the course depended on ending cumulative score rankings.

Decisions were due at specific times, processed by the simulation model, and the results were available to participating teams within two days. This allowed five days before the next set of decisions, required on a weekly basis.

In all trials of this simulation, the importance of each dimension in the overall percentage performance ratings is as follows: sales revenue, 5; after tax earnings, 15; return of equity, 20; bond rating, 20; company value, 20; and strategy rating, 20. The sum, of course, is 100%; and, as a result, each team received a current period and game-to-date score between 0 and 100.

Furthermore, the participants were privy to the algorithm that determines cumulative scores in the simulation. These scores depended upon how each team's cumulative results compared with the leading team's results on each of the above noted six dimensions and their percentage weights.

For example, if the cumulative sales of the leading team are 100, and the second place team's cumulative sales are 80, then the second place team's score on that dimension is

$(80/100)(5)$ or 4 where 5 is the above percentage weight assigned to sales revenue. Each team received a weekly (one year) summary of their year and game-to-date results, and prepared their next decisions based upon these statistics and a vast amount of other data provided by the TE participant's program.

RESULTS

Six years of actual decisions were completed, and the key findings of this study are presented in Tables 1 and 2 and Figures 1 through 5. For example, the two-factor repeated measure analysis of variance shown in Table 1 indicates that on a 0 to 100 performance scale, the average result for winners (**W**) over the six years, 64.5, was significantly higher than the 22.0 average for losers (**L**), $F = 28.59$, $p = .0003$. This was true for each of the six years, $F = 11.47$, $p < .0001$; and the performance by years interaction, $F = 2.07$, $p = .085$, indicates that the large performance difference was fairly constant over the six years—due to its lack of significance. All of this is shown graphically in Figure 1.

THE BUSINESS STRATEGY GAME is a multinational TE simulation that permits competitors to manufacture and market athletic shoes in North America, Europe, Asia, and Latin America as well as private label and Internet sales. Hypothesis *H1* notes that pricing will not be an important **W** and **L** distinction. This is the case as shown in the first six lines of Table 2.

The remaining four hypotheses suggest that **W** firms will have higher quantity demand, lower unit costs of manufacturing and marketing, and higher strategy ratings. Again, using repeated measure analyses of variance, this is the case, except for the unit manufacturing costs, as shown in the last four lines of Table 2. (Note: Due to sixth year mistakes by **L** teams, the unit manufacturing cost includes the first five years only.) **W** firms had more than twice the demand of **L** firms, $F = 20.35$, $p = .0011$. Therefore, it is not surprising that **W** firms had a lower unit cost of manufacturing, not statistically significant, and marketing, $F = 7.82$, $p = .0189$.

Developments in Business Simulation and Experiential Learning, Volume 30, 2003

Table 1

Performance Analysis of Variance Summary

Source	SS	df	MS	F	p
Between Ss	43828	11			
Performance	32470	1	32470	28.59	.0003
Ss w. Groups	11358	10	1135		
Within Ss	16891	60			
Years	8231	5	1646	11.47	<.0001
Performance x Years	1492	5	296	2.07	.0853
Year x Ss w. Groups	7177	50			

Figure 1. Performance

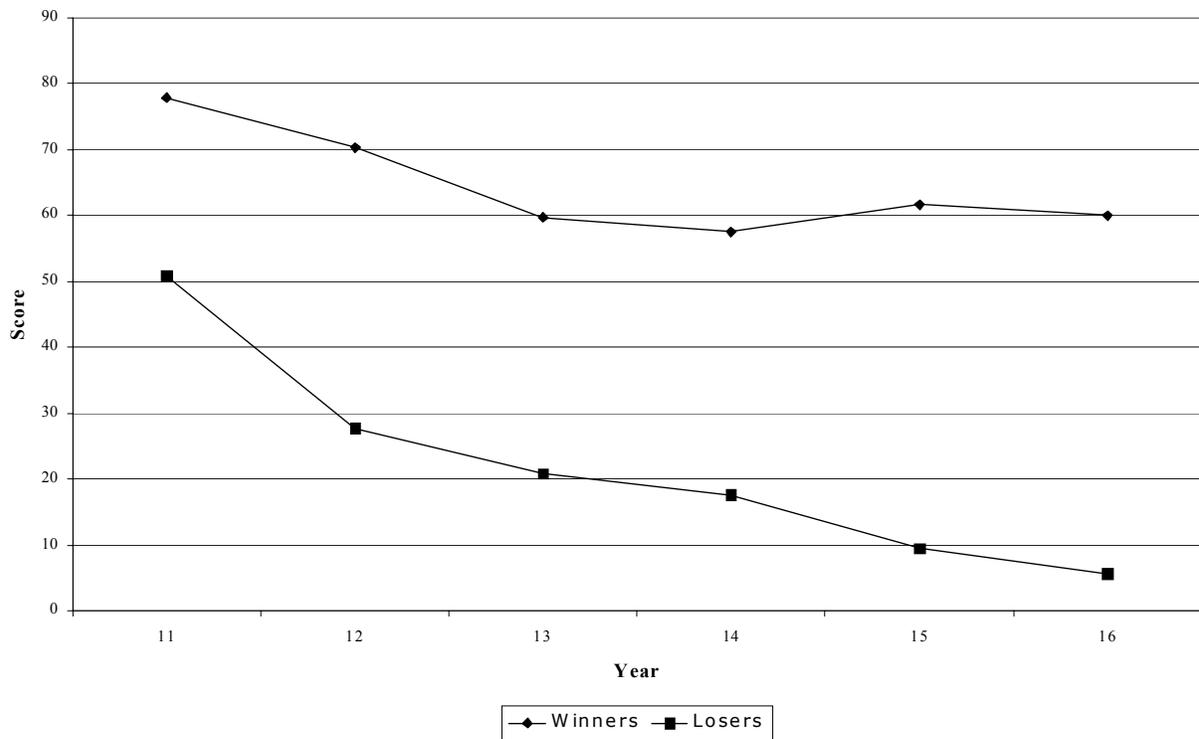


Table 2

Other Results Summary

Factor	Average Scores		F	p
	Winners	Losers		
Pricing				
North America	37.95	40.02	.2682	.6158
Europe	43.27	46.91	.4720	.4092
Asia	36.41	44.12	3.7664	.081
Latin America	54.53	61.16	.0497	.4992
Private Label	37.91	33.76	.4085	.5371
Internet	51.83	57.48	3.4521	.0928
Quantity Demanded	7103	3286	20.3533	.0011
Unit Costs				
Manufacturing	21.66	24.31	1.50	.2483
Marketing	7.78	20.66	7.8209	.0189
Strategy Rating	94.50	34.47	31.5271	.0002

Figure 2. Demand

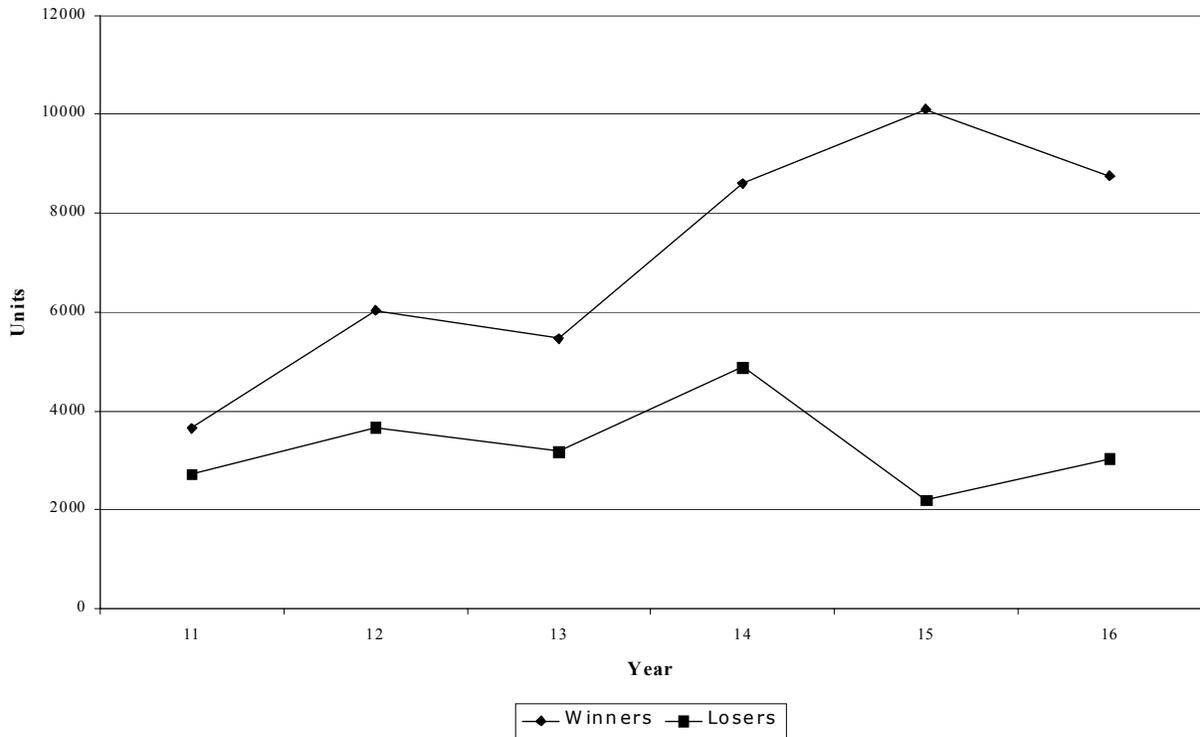
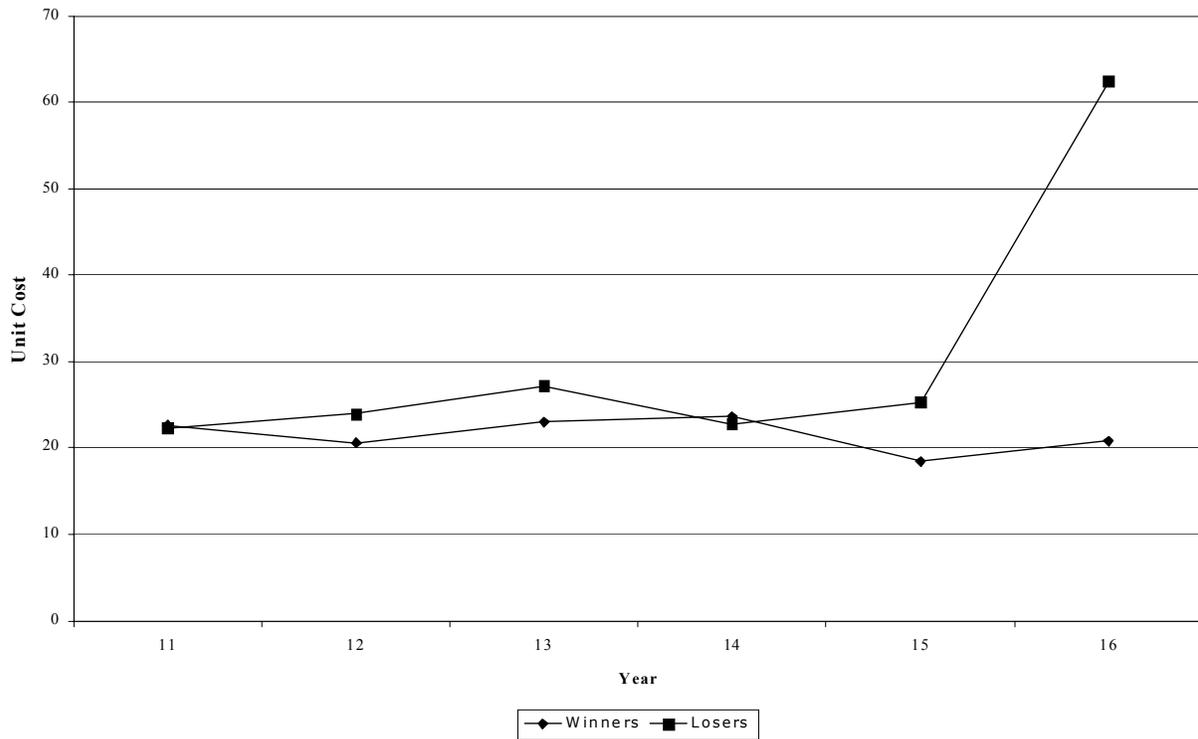


Figure 3. Manufacturing



But in the absence of significant pricing differences, it is especially noteworthy that the average strategy rating difference, 94.5 for **W** teams and 34.5 for **L** teams, is significant, $F = 31.52$, $p = .0002$. These results are graphed in Figures 2 through 5.

DISCUSSION

Experienced TE simulation users are well aware that the participating teams watch carefully each competitor's pricing. But, as the results of this study show, the winning or **W** teams are far more careful than losing or **L** teams with the strategic considerations. Certainly, as noted at the beginning of this article, the authors' knowledge bases reflect their choice of strategic variables. However, their choices are not unusual. Broad or focused product line, quality, service, brand image, low cost, market share leadership, superior value, and global or focused coverage are typical strategic dimensions in the analysis of almost any market.

Furthermore, if the phenomenon reported here tend to repeat, that is strategy ratings continue to be the dominant learning issue, then the path is open to study the correlates of learning in this type of situation. In short, THE BUSINESS STRATEGY GAME provides a researcher with the beginning tools necessary to determine what kinds of individuals and teams prove to be the **W** or **L** types. Grade point averages, individual and group composite personality measures (Patz, 1992), and decision-making styles (Harrison, 1999) are among the most obvious candidates for consideration.

Moreover, it can be stated that the TE simulation knowledge base choices noted at this paper's beginning are assets not liabilities. If simulations can be designed that consistently produce a dominant winning dimension, then learning research will not be muddled by endless interactions among the included variables. Single variable learning research may be taken one step at a time, and multiple variables can be combined in a single TE simulation when the correlates of learning have been demonstrated

Figure 4. Marketing

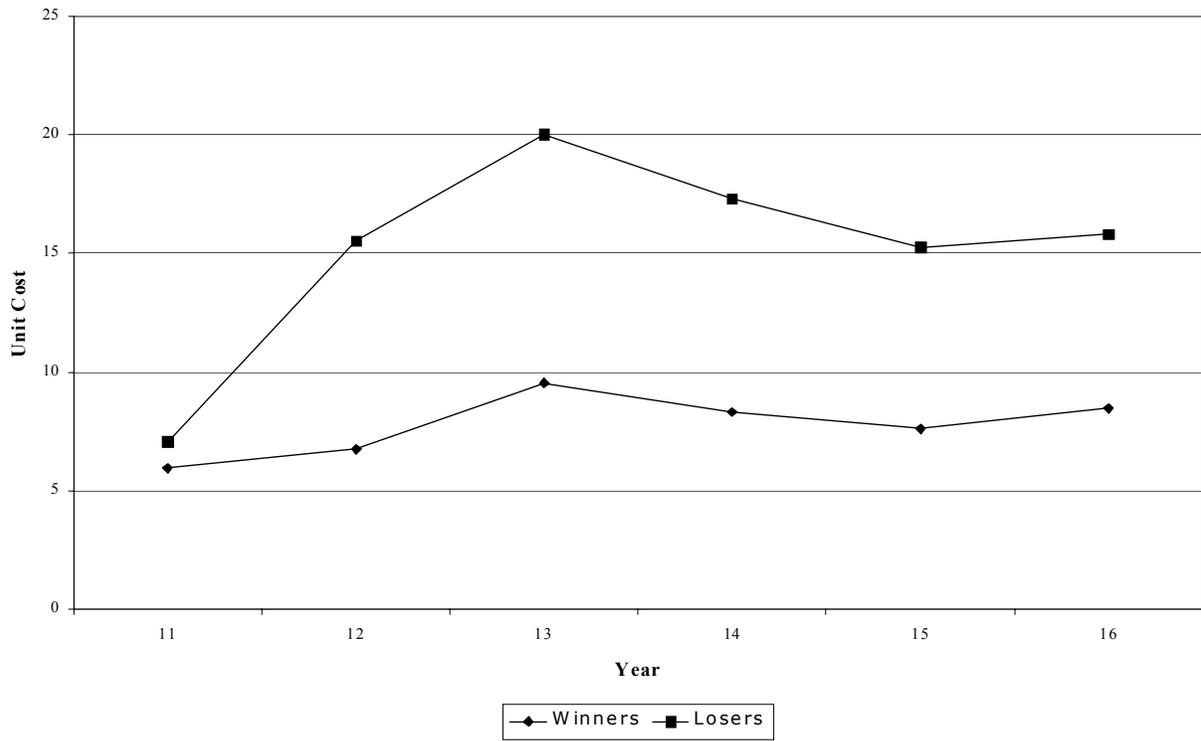
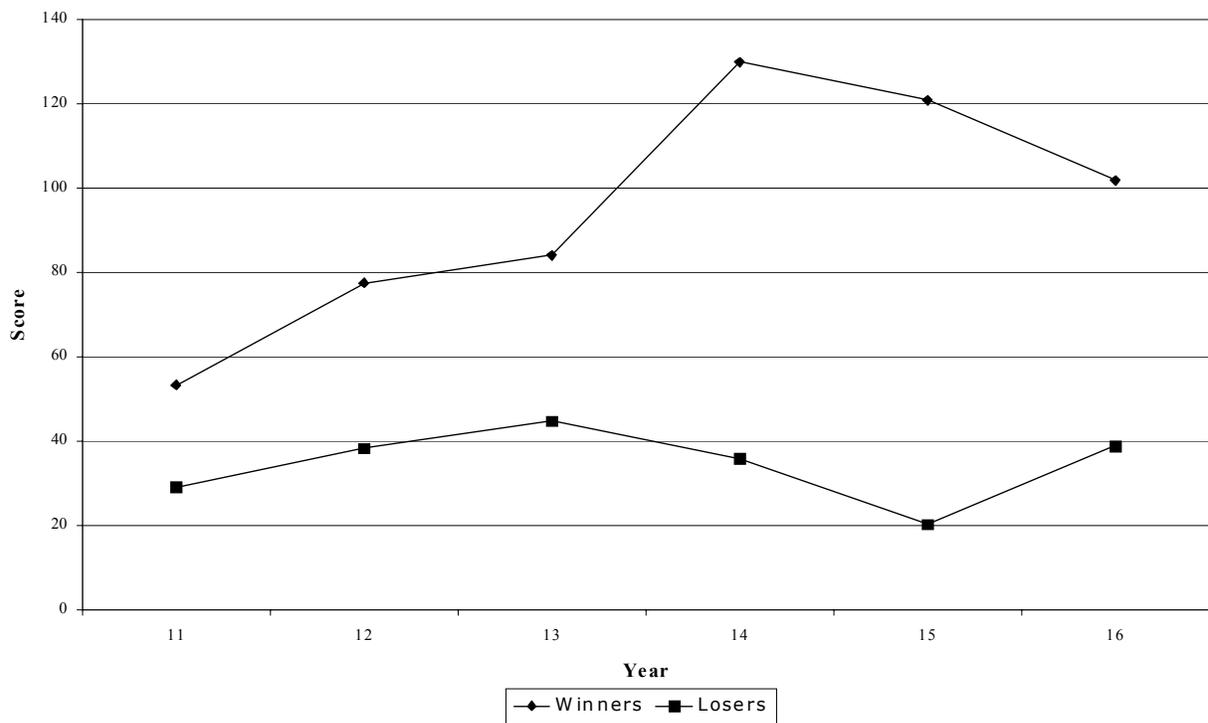


Figure 5. Strategy Rating



REFERENCES

- Goosen, K. R., Jensen, R., & Wells, R. A. (2001). " Purpose and Learning Benefits of Simulations: A Design and Development Perspective." *Simulation and Gaming*, Volume Thirty-Two, Number One, 21-39.
- Harrison, E. F. (1999). *The Managerial Decision Making Process* (5th ed.). Boston: Houghton Mifflin Company.
- Patz, A. L. (1992). "Confidence Extremes Diminish Quality Performance in a Total Enterprise Simulation." *Developments in Business Simulation and Experiential Exercises*, Volume Nineteen, 136-140.
- Patz, A. L. (2001). "Total Enterprise Simulation Winners and Losers." *Developments in Business Simulation and Experiential Exercises*, Volume Twenty-Eight, 192-195.
- Patz, A. L. (2002). "Strategy Learning in a Total Enterprise Simulation." *Developments in Business Simulation and Experiential Exercises*, Volume 29, 143-148.
- Thompson, A. A., & Stappenbeck, G. J. (1999). *The Business Strategy Game: A Global Industry Simulation* (6th ed.). New York: McGraw-Hill Irwin.
- Thompson, A. A., & Stappenbeck, G. J. (2001). *The Business Strategy Game: A Global Industry Simulation* (7th ed.). New York: McGraw-Hill Irwin.