

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

TOTAL ENTERPRISE BUSINESS GAMES AN EVALUATION

J. Bernard Keys, Georgia Southern College

ABSTRACT

This paper reviews ten total enterprise business games currently published by major publishers and available in college classroom formats. Unique features of games are reviewed by functional area covered such as the economy and the industry simulated, marketing variables, production variables, and finance variables. A comparative evaluation of the teaching learning aspects of each game is included. Tables are provided summarizing decision inputs possible in the ten games.

AN EVALUATION

A total enterprise game is a term used to refer to games that include all of the main functions of business as decision inputs—marketing, production, and finance. This paper will describe, compare, contrast, and evaluate a representative sample of ten total enterprise computer-scored business games.

Subjects to be considered in this review will be the decision inputs used by these games, along with game complexity, balance, intended purpose, and supporting information. The games selected for review have been played, are commercially available from reliable publishers, and are priced in a manner to make them available for classroom use. Table 1 shows a listing of the games under review along with bibliographical information. The reader will find assistance from Tables 2, 3, and 4 which include the comparative descriptions of the ten total enterprise games.

TABLE 1 COMPUTERIZED TOTAL ENTERPRISE GAMES

Bibliographical Information

Simulated Game Number

- 1 Henshaw, Richard C. and James R. Jackson, The Executive Game, (fourth edition). Homewood, IL: Richard D. Irwin, Inc., 1984, 194 pages. Fortran II Program and Microcomputer programs in IBM PC, IBM Disk BASIC and Microsoft. Instructor's Manual.
- 2 Smith, Gerald, Manager, A Simulation, Boston, MA.: Houghton Mifflin Company, 1984, 120 pages, Microcomputer Scoring only. Instructor's Manual.
- 3 Keys, Bernard and Robert Wells, Microtronics, John Wiley & Sons, 1987, app. 100 pages, IBM-PC Microcomputer scoring only. Instructors manual, Student disk decision input, Decision support package for students.

- 4 Cotter, Richard V. and David J. Fritzsche, Business Policy Game, Englewood Cliffs, New Jersey, Prentice-Hall, 2nd Edition, 1986 191 pages, Fortran 77 and IBM PC, Instructor's Manual.
- 5 Schellenberger, Robert E. and Lance A. Masters, MANSYM IV, A Dynamic Management Simulator With Decision Support System, New York, NY, John Wiley & Sons, 1986, 118 pages, Instructor's Manual, Mainframe and IBM-PC and student input and output disk, Decision Support System.
- 6 Jensen, Ronald L., and David J. Cherrington, The Business Management Laboratory, Plano, Texas, Business Publications, Inc. Third Edition, 1984, 200 pages +, Fortran IV and IBM PC.
- 7 Eldredge, David L. and Donald L. Bates. The Business Strategy and Policy Game, 230 pages, 1980, Dubuque, Iowa, Wm. C. Brown Company, Publishers.
- 8 Hinton, Roy W. and Daniel C. Smith, STRAT-PLAN, Englewood Cliffs, New Jersey, Prentice-Hall, 1985, 150 pages, Microcomputer IBM PC, Instructor's Manual, Student Disk Input, Decision Support System and Game use Lotus 1-2-3.
- 9 Edge, Alfred, Bernard Keys, and William E. Remus. The Multi-National Management Game, Second Edition, 1985, Plano, Texas, Business Publications, Inc. 140 pages. Fortran IV Mainframe with IBM PC Interactive input and IBM PC Microcomputer scoring. Student disk input for Microcomputer, Instructor's manual, student decision support package under development.

- 10 Scott, Charles R. Jr. and Alonso J. Strickland III, Tempomatic IV, A Management Simulation, Boston, MA., Third Edition, Houghton Mifflin, 1984, 120 pages, Fortran IV, 60-120 K of core and 80 column format.

Note: One of the same authors has a very similar game available in a PC Version NAPC Version which will not be reviewed because of duplication. Strickland, Alonso J., III, and Timothy W. Scott, Micromatic, A Management Simulation, Houghton Mifflin, 1985, 120 pages, IBM PC and Apple II, Student disk input, Student decision support system using VisiCalc/Lotus.

THE ECONOMY AND INDUSTRY SIMULATED

All total enterprise games include some method of depicting the economy and industry within which competing teams will operate. Most games build the economy around a set of indices of economic activity and include

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

seasonal fluctuations, cyclical downturns and upturns and growth curves built on quarterly decisions. One game reviewed, STRAT-PLAN (8), utilizes years rather than quarters as decisions periods which allows teams to think more in terms of "strategic" long term horizons rather than "tactical" or short run decisions. Such a game structure is typical of the new games being developed for in-house training at many large corporations and in several of the graduate schools of management. A similar game is under construction at Georgia Southern's Center for Advancement of Business Simulation and Experiential Learning (CABSEL).

Some of the less complex games include some surprisingly sophisticated economic variables. For example The Executive Game includes an inflation variable, usually found only in consulting and training games. Tempomatic (3) calls for the use of the Business Week Index to tie the game to fluctuations in the real world economy. Most games allow administrators to have control over the economic indices, therefore such an innovation can be used with most games. The Multinational Management Game (MNG) (9) utilizes an economic index with leads and lags for three of the nations including the United States, West Germany, and Japan, based on the history of the interrelationship of these economies. As in most games, the actual base index is controlled by the administrator. All games reviewed provide some type of economic forecast for the teams, but the number of quarters or years projected varies from game to game. Manager (2) projects forecasts six quarters into the future while STRAT-PLAN (8) based on a yearly decision round, projects forecasts, by market, one year into the future. Some games, such as Tempomatic IV (3), actually give a forecast by market area in terms of total unit sales potential. The sales potential base in Tempomatic is modified by the Business Week Index, as noted above.

MARKETING VARIABLES

Product. One of the most distinguishing factors to be considered in the choice of a game is the type of product the game portrays. Many of the games use a generic product description, defining the product only in terms of price range or customer served. The rationale for such a description is provided for the Gidget in Tempomatic IV, "This vagueness is intentional and precludes the participant's basing his decision on the known actions of any real company" (10, p. 1). Other games describe the product by industry or standard product classifications. For example, The Multinational Management Game (9) uses a general product description: Product A consists of a branded consumer good sold to retailers, while Product B consists of an unfinished good sold directly to industrial customers.

Defining specific products such as stainless steel flatware or cookware, as does The Business Management Laboratory (7), greatly enriches the marketing area and the potential for library and industry research. However, there is some danger that in the latter case students will simply try to mimic the more successful firms without relying on their own analyses.

MANSYM IV incorporates a very versatile real product line description, allowing product parameters to be changed by the game administrator to simulate the small kitchen appliance industry, textiles, wood, and the food products industry.

TABLE 2 MARKETING VARIABLES

	1	2	3	4	5	6	7	8	9	10
	The Ex- Game	A Sim.	RECRO- THETIC	BPS	MARSH BML	BPS	STRAT- PLAN	MNC	Tempo- matic IV	
FORECASTING:										
By Mkt. By Nation By Area										
PRODUCTS:	x	x	x	x	x	x	x	x	x	x
Research and Development	x	x	x	By Product	By Product	x	x	By Prod.	By Prod.	x
Number of Products	1	1	1	1	2	2	1	2	2	2
Product Description Generic (G)	6	Auto Radio	Micro Computer	6	Kitchen Appliance	Flatware	Convenience Ref.able	6	Ind. Perfor.	6
More					Cook Ware	Ref. Meters				
PRICE	x	x	x	By Area	By Prod.	By Mkt.	By Prod.	By Prod.	By Mkt.	x
PLACE:										
Distribution Centers/ Regional Offices										
Marketing Areas International Transfer of Product	1	1	1	4	1	2	3	3	3	3
By Mkt.										
By Prod.										
PROMOTION:	x	x	x	x	x	x	x	x	x	x
Salemen:										
Retail										
Trained										
Salaries										
Commission										
Advertising:			x	By Area	x	By Area	By Prod.	By Prod.	By Nation	
Local National Other Promotion										
MARKETING RESEARCH:										
Purchase of Mkt. Information										9 items
Social Responsibility Incidents										

Most games incorporate some means of increasing product quality or differentiating the product on a competitive basis. One of the more innovative approaches is that of The Business Policy Game (4). R & D expenditures can improve the product through simulated feature improvement, but they can also make available new models, which the firm can, with a discretionary decision, introduce. Each model has a number attached to it, and once introduced, must replace the older model. Marketing studies are available stating the likelihood of a new model's sales exceeding that of the old. Each new model also has a different labor and material cost associated with it. The Business Management Laboratory (BML) game uses a similar but less complex approach by simply allowing teams to invest funds with the hope of a "distinctive product improvement" at certain levels of accumulated expenditures on one Research and Development activity.

Price. The price variable described in MNG (9) is typical for total enterprise games. The game incorporates price/elasticity, meaning that with other factors constant, more revenue will be generated by lowering price in the elastic range and by raising price in the inelastic range. In this particular game the market for the industrial product is much more price elastic than that

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

of the consumer product, as is true in real life.

Most of the games reviewed incorporate prices in the \$10-\$100 range, probably because they have chosen as their products small consumer goods with which participants are most familiar.

Place. The relatively simple games such as Mictronics (3), Manager (2), and The Executive Game (1), do not define specific market areas for their products. Other games define markets generically in terms of price, product, quality, or area sales potential. The game, STRAT-PLAN (8), allows the administrator to establish up to three geographical market areas, two of which may be international markets. The MNG (9) offers less flexibility, but a similar scenario, requiring that all teams operate out of a U.S. headquarters, but with full divisions operating in West Germany, and Japan. Both games have different growth rates for each divisional market and both incorporate currency exchange rates from real world reports.

PRODUCTION

Plant Capacity. All the games reviewed, except MICROTRONICS, allow participants to expand plant capacity, either by building additional plants or locating new plants, often in other market areas or nations. Capacity expansion usually requires a one quarter lag before the new capacity becomes available. MICROTRONICS allows production increases by hiring additional employees and by scheduling overtime, but because of the game's emphasis on behavioral factors and its relatively small size, does not allow the scale of plant to change. The BML game (6) has one of the more elaborate production functions, including two stages of production with possible plant capacity expansion in either of the two stages for two different market areas.

Neither MANSYM (5) nor BML (6) allow capacity to be sold or reduced once it has been purchased. This is realistic since few companies can find a ready market for their plants in the short term. However, since most real-world firms can eventually find ways to dispose of unwanted plant, often recouping some capital, some game authors prefer to offer plant capacity as a reversible decision. MANSYM (5) allows the investment in new labor saving equipment, also requiring a one quarter lag for use, but requiring payment in the quarter scheduled. BML allows the subcontracting of work to noncompetitive fabricators.

Production Scheduling. Simpler games allow production scheduling up to the plant's capacity level but all except one include an overtime option (2). Moderately complex and very complex games include scheduling by multiple products on the same line, and often by production stages. These games include production functions that make the use of quantitative decision techniques, such as linear programming, feasible. Production that can be scheduled each quarter is usually limited by the capacity function described above. However most games allow overtime or second shift operations. Some of the more complex games

allow contracting out of production and others allow transfer of finished product from area to area (3, 4, & 6) or nation to nation (8 & 9).

TABLE 3 PRODUCTION VARIABLES

	1	2	3	4	5	6	7	8	9	10
	MAN.	2	3	4	5	6	7	8	9	10
	MICROTRONICS	STRAT-PLAN	MANSYM	BML	SEPS	SEPS	SEPS	SEPS	SEPS	TEMPOMATIC IV
PLANT CAPACITY:										
Changes	x	x	x	x	x	x	x	x	x	x
Multiple Plant										
By Area	x									
By Area By Stage		x								
By Product			x							
By Area				x						
By Nation					x					
By Area						x				
PRODUCTION SCHEDULING:										
Batch	x	x	x	x	x	x	x	x	x	x
Multiple Shifts		x	x	x	x	x	x	x	x	x
Stages			x	x	x	x	x	x	x	x
Subcontracting			x	x	x	x	x	x	x	x
Inventory Transfers			x	x	x	x	x	x	x	x
MATERIALS PURCHASE:										
Materials Choice							x	x	x	x
Current							x	x	x	x
Future							x	x	x	x
By Area								x	x	x
PRODUCTION WORKERS:										
Hired/Discharged	x	x	x	x	x	x	x	x	x	x
Scheduled							x	x	x	x
Training							x	x	x	x
Hourly Wage		x	x	x	x	x	x	x	x	x
Lay-off			x	x	x	x	x	x	x	x
Double Time Pay			x	x	x	x	x	x	x	x
Fringe Benefits			x	x	x	x	x	x	x	x
Profit Sharing			x	x	x	x	x	x	x	x
OPERATIONS RESEARCH:										
Engineering			x	x	x	x	x	x	x	x
Quality Control			x	x	x	x	x	x	x	x
Cost			x	x	x	x	x	x	x	x
Pollution Control				x	x	x	x	x	x	x
Automation or Cost/Saving Equipment				x	x	x	x	x	x	x
MAINTENANCE:										
	x				x	x	x	x	x	x
WAREHOUSING:										
Allotment Finished Product			x	x	x	x	x	x	x	x
INVENTORY COSTS:										
Accounting Choice				x	x	x	x	x	x	x
Behavioral Incidents:										
Executive Compensation			x	x	x	x	x	x	x	x

Materials Purchase. In games 2, 3, 4, 8 & 9 materials are automatically ordered when production is scheduled. The other games, some simple and some complex, include materials ordered as a major decision variable. The rationale of one of the more complex games, STRAT-PLAN (8, p. 61) is expressed by a quote: "STRAT-PLAN emphasizes long-range issues. It provides opportunities to expand facilities, reduce production costs, abandon markets, etc. Because of this outlook, some issues like inventories, seasonal demand variations, or shipping delays have been played down, while others that are normally lost in the day-to-day process of running a business take on new vitality."

Production Workers. Behavioral employee issues have been omitted from most total enterprise games. In TEMPOMATIC IV the work force is composed of three person crews of semi-skilled workers and each worker is paid \$2,500 per quarter plus overtime. Workers can be laid-off, but automatically return in a future quarter, unless permanently discharged. There is a normal turnover rate requiring some continuous hiring and some loss of workers due to probabilistic turnover. Having the simulated employees and crews has allowed users of TEMPOMATIC IV to engage in very realistic role plays over labor contract negotiations.

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

The Business Policy and Strategy Game (BUSPOG) (7) includes a chapter on Personnel and calls for personnel plans for sales persons and hourly workers. More uniquely still, by utilizing training programs or profit sharing, productivity in units per person-hour and raw materials requirements per unit can be improved. Microtronics (3), includes a labor force that can be hired and terminated and whose pay can be raised. Success with the hourly employees is measured by a productivity index, and a turnover and absenteeism index. For each decision round participants must respond to a series of behavioral incidents. Each incident includes a proposal with corresponding costs and pay-offs for acceptance. By careful human resource management, productivity per employee can be increased and turnover can be reduced.

Research, Development and Engineering. All the games reviewed included some type of R & D variable. The R & D function for games (1), (3) and (9) are multi-functional and capable of lowering product costs and increasing market share. STRAT-PLAN (8) includes R & D affects on product costs and quality as well as a Technical Investment. The BML game (6) utilizes an engineering process study to improve plant efficiency, R & D for new product development, and quality control for improved product quality. MANSYM IV (5) and the Business Policy Game (4) prefer to emphasize R & D on the consumer side; the former with product enhancement studies that can make a one time change in the functional features of the product, the latter by allowing the release of new products at periodic intervals of R & D investment.

In some games a certain level of maintenance is required to maintain full capacity of production (6), in others expenditures on maintenance tend to lower labor and materials costs (1). BML requires different expenditures on maintenance by production stage (6) and the Business Policy Game (4) requires maintenance expenditures for each production line. Game (1, p. 17) teaches an important principle by experience: "If you permit the factory to deteriorate, it may be difficult to get its operations back into good shape."

Other Production Variables. Equipment replacement costs are required to maintain production lines in the Business Policy Game (4). BML (6) allows the choice of either LIFO or FIFO in treating inventory costs as well as a standard cost system, and a weighted cost method. MANSYM IV allows a possible one time investment in new cost saving equipment.

FINANCE

The less complex games tend to simplify their finance areas. The Executive Game (1) automatically provides loans at above normal interest rates if the firm's cash assets fall below zero. This special type of loan, or disaster loan, as it is called in the BUSPOG game (7) is a variable common among the games reviewed. The other two simpler games reviewed, Microtronics (3) and Manager (2), allow participants to borrow funds and sell or purchase stock, variables that are present in all the other games reviewed. BML includes finance options of factoring, delay in

accounts payable, emergency loans, short term loans, term loans, private placements with venture capital firms, bonds, and common stock.

TABLE 4 FINANCIAL VARIABLES

	1	2	3	4	5	6	7	8	9	10
	The	Amr.	Micro-	SPS	MANSYM	BML	BSPS	STRAT-	MNG	TEMPO-
	Exec.	Bus.	TRONICS	Game	IV	PLAN	IV	PLAN	IV	MATIC
TAXES										
FINANCE:										
Short-Term Loans										
Accounts Receivable	x	x	x	x	x	x	x	x	x	x
Emergency Loans	x	x	x	x	x	x	x	x	x	x
Factoring										
Long-Term Loans	x	x	x	x	x	x	x	x	x	x
Venture Capital										
Transfer of Cash										
Among Divisions									x	x
International Currency									x	x
Bonds										
Issued/Sold					x	x	x	x	x	x
Negotiations					x	x	x	x	x	x
Stock										
Purchased/Sale	x	x	x	x	x	x	x	x	x	x
Dividend Payout	x	x	x	x	x	x	x	x	x	x
Investment Choices										
CD's	x	x	x	x	x	x	x	x	x	x
Officer Salary Plans	x									

Both STRAT-PLAN (8) and MNG (9) allow the transfer of cash funds from market to market. In the STRAT-PLAN game if cash is not available in a market to cover expenditures, the expenditures will be aborted. MNG uses the special loan variable to cover potential cash outages, but charges above normal rates for this coverage. Both STRAT-PLAN and MNG operate with international markets and therefore include international currencies.

Investments and Savings. Opportunities for investments and savings accounts are uncommon among the less complex games reviewed. The BUSPOG Game (7) allows deposits and withdrawals from an interest paying savings account. TEMPOMATIC IV allows short term investments and withdrawals at an interest rate pre-set by the game administrator. The Business Policy Game (4) is creative allowing three-month time certificates of deposit while MANSYM IV allows firms to invest by a type of negative loan. BML (6) includes an opportunity for teams to invest in any one of four short term portfolios, each of which includes different degrees of risk which serve as collateral in the event of a cash shortage.

COMPARATIVE EVALUATION

From this review of the ten games, it appears that total enterprise games are providing more content within the student manuals provided. For example the latest edition of THE EXECUTIVE GAME (1) includes a chapter on planning not found in earlier editions. MNG (9) weaves numerous international business concepts among the game instructions. Almost every section of game decision information such as advertising or salesmen includes a section on national trends. The marketing

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

section of the BUSINESS POLICY GAME (4) proliferates with examples from industry. For example when illustrating the short product life cycle of products and the development of replacement products an illustration is used of Quaker States' innovative screw-on top for oil cans. MANSYM IV (5) tends to treat variables more analytically than historically and provides analysis and computation of numerous illustrations strategy.

All games reviewed provide feedback of a computerized income statement and balance sheet, although some are quite unorthodox and difficult to follow. In addition, several of the games require structured experiences that force reflection and learning. Most of the games reviewed include some kind of planning sheets or package to structure the planning of teams. Planning sheets packages tend to cause students to learn from experience by structuring their experiences. Most planning packages include planning sheets on sales forecasting, production scheduling, pro forma income statements, and cash flow analysis.

One of the greatest innovations of recent game editions is the micro decision support package now available for games 3, 6, 8, & 10. (Other games reviewed may have decision support packages under development but information for such is not presently available). Some of these packages utilize Lotus 1-2-3 and require that the user purchase the Lotus package (8). Microtronics includes a decision support package known as the Electronic Work Sheets (EWS) that follow the same series noted above but also includes a series of financial ratios.

SUMMARY

Total enterprise games have improved greatly in educational value, simulated realism and administrative simplicity, since the late 1950's when games were first utilized in business schools. The ten games reviewed in this article provide a wide spectrum of complexity from the very simple eleven decision game of Manager (2) to the very complex BML game (6) which has available over sixty different team decisions per round of play. First, the games reviewed include more business knowledge and examples within student manuals than did the earlier versions. This signifies a healthy trend away from the notion that instructors should provide teams with a competitive experience and allow them to have entirely from game experience without further guidance. Second, there is a general trend toward incorporating more of the "softer" functions of business in total enterprise games, facilitated largely by an improved simulation of employees in the work force and the corresponding decisions which such simulation elicits.

Many of the games reviewed have been converted from mainframe to micro-computer scoring to free instructors of dependency on data processing while conducting a class. This conversion has also made games easier to modify and has potentially placed more control of starting positions and game variable strength in the hands of instructors utilizing games. Many of the games actually allow students to input decisions on micro disks.

So that no data input is required of the game administrator, the more complex total enterprise game authors are developing decision support packages that allow students to conduct "what if" analysis and print out planning sheets for such areas as sales forecasting, pro forma income statements, cash budgeting and ratio analysis. This development offers hope of greatly increasing learning from games by reducing student mechanical number processing

and allow them to focus on significant results from alternative inputs. Further, this development can shorten game decision cycle time required for students to progress through the learning curve in a complex game.

The simpler PC scored total enterprise games are becoming very user friendly, driven entirely by menus which allow them to be used in short training programs and at distant sites, scored by portable PC's.

The combination of increased available range of simulation, decision support package availability, menu driven PC scoring and general micro computer familiarity in society has caused a significant new surge of interest in the use of total enterprise games both in collegiate and industrial training.

References available upon request.