

A WEB BASED TOTAL ENTERPRISE SIMULATION

David A. Jordan
Geneva College
dave@bussim-ed.com

ABSTRACT

This 'Games to Play' session will provide the opportunity for attendees to play a new web-based total enterprise simulation. The focus of this simulation is on the coordination of the functions in a manufacturing organization. All four functional areas are modeled with equal complexity so as to provide a balanced assessment of each function's contribution to the organization. The player manages a single company that is part of a ten-company industry. The computer's role is to process the decisions and make decisions for the other nine companies. These decisions are quickly simulated and reports are produced that show the results of these decisions. The goal of this session is to present a total enterprise simulation that is web-based, can be played in a reasonable time frame and includes all functional decision areas. It is hoped that this session will help attendees assess the benefits and challenges associated with using a web based total enterprise simulation.

BusSim Total Enterprise Business Simulation (Web Edition)

Budget Decisions

Advertising (\$000) 200

Promotion (\$000) 150

Quality (\$000) 150

R and D (\$000) 100

Technology (000) 100

Incentives (\$000) 0

Training (\$000) 20

Maintenance (\$000) 30

Functional Decisions

Marketing Human Resource

Finance Operations



Quarter 1

Current Outcomes

Demand 280,637

Sales 280,369

Production 288,885

FG Inventory 8,549

Capacity 300,000

Profit \$971,063

Shares 600,000

Share Price \$20.69

Simulate

ReSet

Financials

Research Reports

Detail

Performance

Information

Industry Averages

Quarter	Advertising	Promotion	Quality	RandD	Technology	Incentives	Training	Maint	Profit
1	\$196,564	\$149,323	\$153,696	\$102,025	\$96,973	\$0	\$19,683	\$29,589	\$860,231

UserName: undefined Developed by: David A. Jordan (www.bussim-ed.com)

SHORT DESCRIPTION

The focus of this simulation is on the coordination of the functions in a manufacturing organization. Three different products are produced by the manufacturing facility. Twelve quarters of simulated operation are provided with this simulation. The player manages a single company that is part of a ten-company industry. The computer's role is to process the decisions and make decisions for the other nine companies. These decisions are quickly simulated and reports are produced that show the results of these decisions. The figure below is a display of the opening screen.

The simulation begins in Quarter 1 with a capacity of 300,000 units of production. Demand will increase and is seasonally distributed (see

'Information' screen). The Decision variables listed below should be changed to reflect player strategies, i.e. high price/high quality, constant production/production that follows demand, etc. Decision values may be changed from their initial values by pressing the up/down arrows in each decision block. The Functional Decisions are optional and only need to be selected if changes are to be made.

Decision Variables

- Budgeting – Includes expenditure decisions for advertising, promotion, quality, R & D, technology, incentives, training and maintenance.
- Marketing – Includes advertising media decisions, distribution channel decisions, pricing decisions and market research decisions.

- Finance -- Includes source of cash decisions, use of cash decisions and expansion decisions.
- Operations -- Includes ordering raw material decisions and resource scheduling decisions.
- Human Resource -- Includes compensation decisions, benefit decisions and hiring decisions.

The model in this simulation compares demand (desired units) to supply (available units) and determines the units sold, revenue, expenses and resulting profit for each quarter's operation. Each quarter's earnings are converted to cash as collections (current and receivables) are received. *Inventory can be a big user of cash.* If cash goes below zero, a loan will automatically be made to bring cash to zero. Six performance metrics are calculated and displayed on the 'Performance' Report. These include financial return, market share, productivity, quality index, share price and a composite (weighted average) performance rating metric. The Performance Rating is the best measure of overall success.

Session Goals

- To present an efficient means of planning for simulation operation.
- To determine the right mix of decision values to achieve stated objectives.
 1. Find the best decision value mix to maximize profitability.
 2. Find the best decision value mix to maximize the performance rating.
- Explain the difference in your decision processes to accomplish each objective.
- Assess performance by comparing run ratings with other participants and compare strategies.

Logistics

1. This session requires about 1 hour.
2. A minimum of 2 participants and a maximum of 12 are needed.
3. Each participant should have a laptop computer with Excel available. Connection to the Internet or local network is desirable but not required. A projector is also required in the room to demonstrate the simulation.

A WEB BASED TOTAL ENTERPRISE SIMULATION

Figure 1
Opening Screen

BusSim Total Enterprise Business Simulation (Web Edition)

Budget Decisions

Advertising (\$000)

Promotion (\$000)

Quality (\$000)

R and D (\$000)

Technology (000)

Incentives (\$000)

Training (\$000)

Maintenance (\$000)

Functional Decisions

Marketing

Human Resource

Finance

Operations



Current Outcomes

Demand

Sales

Production

FG Inventory

Capacity

Profit

Shares

Share Price

Industry Averages

Quarter	Advertising	Promotion	Quality	RandD	Technology	Incentives	Training	Maint	Profit
1	\$196,564	\$149,323	\$153,896	\$102,025	\$96,973	\$0	\$19,683	\$29,589	\$860,231

UserName: undefined Developed by: David A. Jordan (www.bussim-ed.com)

The primary goal of a total enterprise business simulation is to replicate the complexity of today's dynamic business environment. A greater appreciation of the interconnectedness of topics and the systematic nature of business organizations can be achieved by simultaneously focusing on the variety of decisions a manager must make over a period of time. This simulation seeks to model the decisions made by managers of a small manufacturing business. The focus of this simulation is on the *coordination of the functions* in the organization. Three different products are produced by the manufacturing facility. Twelve quarters of simulated operation are provided with this simulation. The player manages a single company that is part of a ten-company industry. The computer's role is to process the decisions and make decisions for the other nine companies. These decisions are quickly simulated and reports are produced that show the results of these decisions. The player is responsible for scheduling all the resources necessary to produce and sell

these products. Figure 1 above is a display of the opening screen.

SIMULATION PLANNING

Planning player decisions is a very important part of the learning experience from a Total Enterprise simulation. The Decision Flow chart in Appendix A presents the ideal flow of decisions that need to occur for effective operation of this simulation. A brief summary showing the order of decisions is provided here.

1. Forecast Demand
2. Consider Productivity
3. Set Production
4. Determine Sales
5. Allocate Cash

A Decision Worksheet, formatted in Excel, is displayed in Appendix B. This is a handy tool that does all of the computations needed to make each of the decisions shown

in the flowchart. The final display in this tool is a Budget Worksheet that converts player decisions into expected profitability. Different player strategies can be investigated using these tools as important guides to effective planning. *Simulation without planning is merely game playing and not the prescription for effective learning.*

ENTERING DECISIONS

The Decision variables listed below should be changed to reflect player strategies, i.e. high price/high quality, constant production/production that follows demand, etc. Decision values may be changed from their initial values. A quick description of the effect of changing the budget decisions is presented in Figure 2. The functional decisions are optional and only need to be selected if changes are to be made. The worksheets described in the previous section should be consulted when entering these decisions.

- Budgeting – Includes expenditure decisions for advertising, promotion, quality, R & D, technology, incentives, training and maintenance.
- Marketing – Includes advertising media decisions, distribution channel decisions, pricing decisions and market research decisions.
- Finance -- Includes source of cash decisions, use of cash decisions and expansion decisions.
- Operations -- Includes ordering raw material decisions and resource scheduling decisions.
- Human Resource -- Includes compensation decisions, benefit decisions and hiring decisions.

SIMULATING PERIODS

The simulation begins in Quarter 1 with a capacity of 300,000 units of production. Demand will increase and is seasonally distributed (see **‘Information’**). The model in this simulation compares demand (desired units) to supply (available units) and determines the units sold, revenue, expenses and resulting profit for each quarter’s operation. Each quarter’s earnings are converted to cash as collections (current and receivables) are received. *Inventory can be a big user of cash.* If cash goes below zero, a loan will automatically be made to bring cash to zero (see **‘Financials’**). To display detailed information on the

results of production, marketing and human resource decisions, see the **‘Detail’** report. If research studies were chosen and expensed, reports of these studies will be available by selecting **‘Research Reports’**.

Six performance metrics are calculated and displayed on the **‘Performance’** Report. These include financial return, market share, productivity, quality index, share price and a composite (weighted average) performance rating metric. The Performance Rating is the best measure of overall success.

After simulating a period, the Current Outcomes Window (see Figure 1) is updated and should be used to review the results for the current period. This window displays the current demand, sales, production, inventory, capacity, profit, shares of stock and share price. These outcomes should be used to plan the decisions next quarter. The short term goal of increasing share price is a quick measure of the success of your current decisions because it measures external satisfaction with player profitability.

FINAL EVALUATION

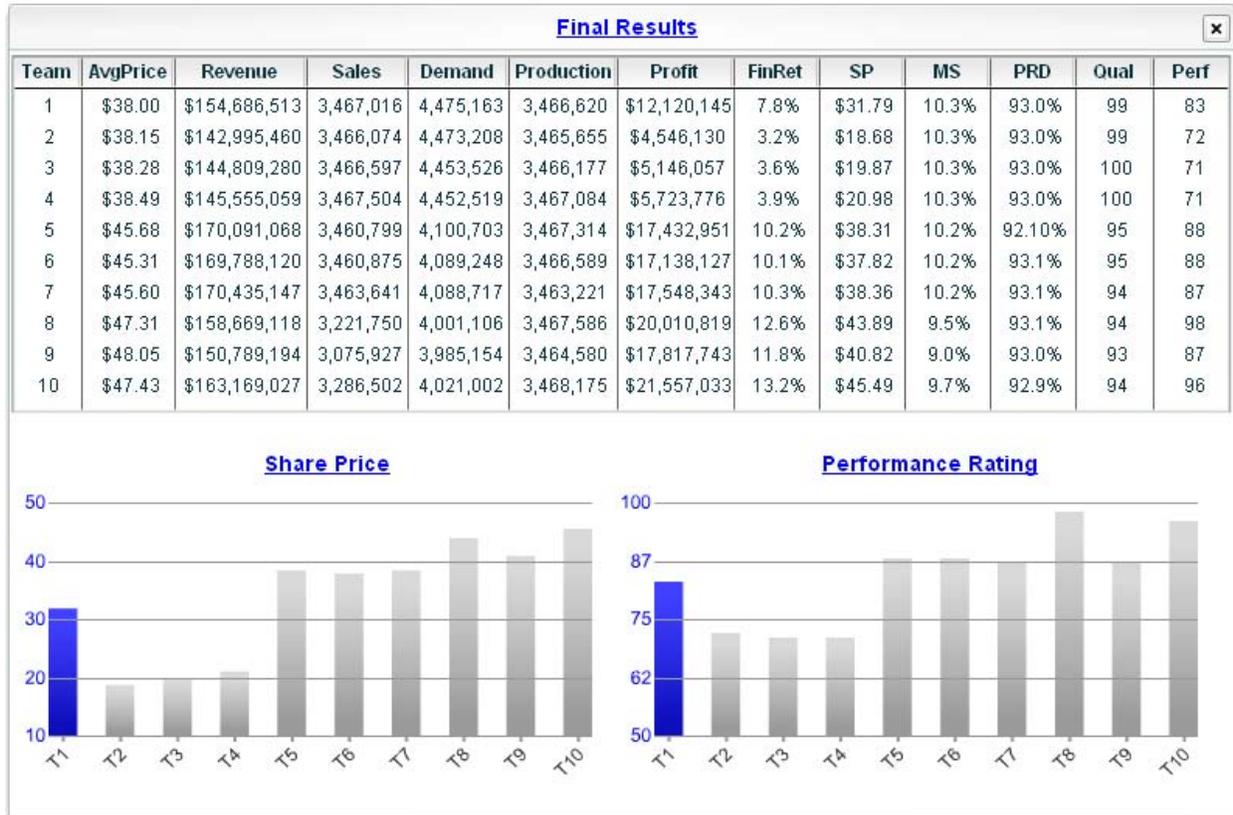
After 12 quarters have been simulated, a ‘Final’ Report is available for display (see Figure 3). This report provides performance information on each of the 10 teams in the industry. Team 1 on the report displays the results for the current player. This simulation can be played multiple times (see **‘ReSet’**) until the desired set of learning outcomes is achieved.

Figure 2
Budget Decision Variable Descriptions

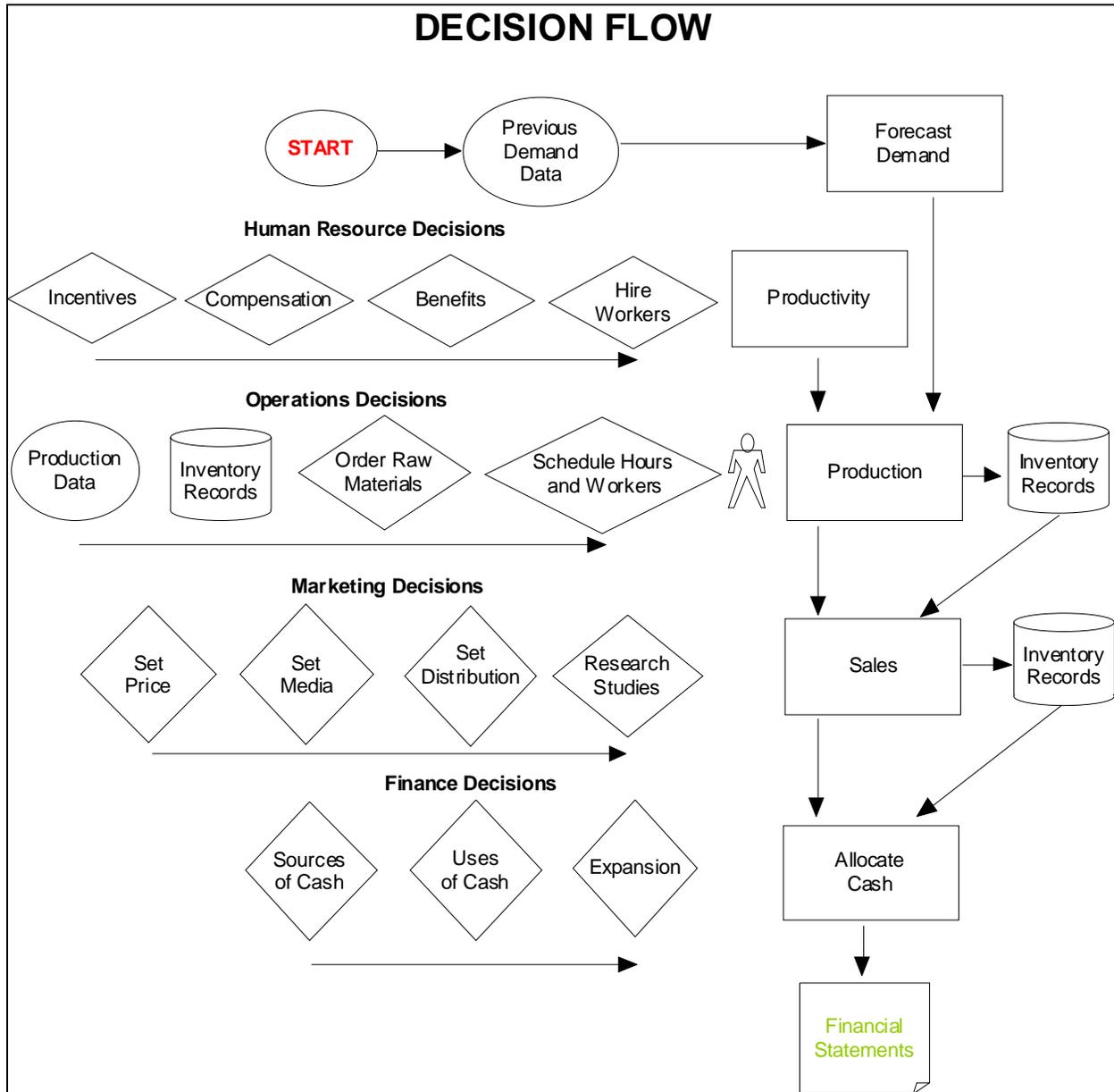
Variable	Description
Advertising	Used in determining exposure and sales
Promotion	Used in determining sales. Affects convenience quality
Quality	Used in determining product quality, demand and production quality control
R & D	Used in determining product quality and demand
Technology	Used in determining production standards
Incentives	Used in determining productivity.
Training	Used in determining productivity.
Maintenance	Used in determining the likelihood of break downs

Figure 3
Final Report

BusSim Total Enterprise Business Simulation (Web Edition)



Appendix A Recommended Decision Flow Process



Appendix B Excel Planning Worksheets

DECISION WORKSHEET					BUDGET WORKSHEET					
		Quarter								
		1	2	3	4	OutdoorPak	SchoolPak	SportPak	Total	
Demand										
OutdoorPak		170,000	200,000	240,000	180,000	Std Labor	\$7.00	\$4.00	\$2.00	
SchoolPak		70,000	90,000	150,000	100,000	Std Material	\$18.00	\$8.00	\$6.00	
SportPak		35,000	50,000	60,000	90,000	Std OH	\$6.00	\$6.00	\$6.00	
Total		275,000	340,000	450,000	370,000	Variable Cost	\$31.00	\$18.00	\$14.00	
						Forecast	170,000	70,000	35,000	275,000
Production						Wholesale Sales	85,000	35,000	17,500	137,500
Capacity		300,000	300,000	300,000	300,000	Retail Sales	51,000	21,000	10,500	82,500
Raw Material Requirements						Direct Sales	34,000	14,000	7,000	55,000
Fabric (Rolls)		1,235	1,510	1,980	1,570	Revenue	\$10,030,000	\$1,967,000	\$787,500	\$12,784,500
Hardware (Packets)		275,000	340,000	450,000	370,000	Inventory	0	0	0	
Tubes		170,000	200,000	240,000	180,000	Production	170,000	70,000	35,000	275,000
						Direct Labor	\$1,190,000	\$280,000	\$70,000	\$1,540,000
Scheduling Requirements	Workers	Hours	Hours	Hours	Hours	Direct Materials	\$3,060,000	\$560,000	\$210,000	\$3,830,000
Fabrication	15	458.3	566.7	750.0	616.7	MOH	\$1,020,000	\$420,000	\$210,000	\$1,650,000
OutdoorPak Assembly	50	485.7	571.4	685.7	514.3	Total Direct Exp				\$7,020,000
SchoolPak Assembly	15	466.7	600.0	1,000.0	666.7	Technology				\$100,000
SportPak Assembly	7	454.5	649.4	779.2	1,168.8	Maintenance				\$30,000
						Inv Carrying				\$0
Marketing		OutdoorPak	SchoolPak	SportPak		Total Operations				\$130,000
Product Distribution		60%	30%	10%		Wholesale(Cost/unit)				\$2.00
Pricing Decisions						Retail(Cost/unit)				\$10.00
MSRP		\$99.95	\$44.95	\$39.95		Direct(Cost/unit)				\$5.00
Wholesale		\$50.00	\$25.00	\$20.00		Wholesale	\$170,000	\$70,000	\$35,000	\$275,000
Retail		\$70.00	\$32.00	\$25.00		Retail	\$510,000	\$210,000	\$105,000	\$825,000
Direct		\$65.00	\$30.00	\$25.00		Direct	\$170,000	\$70,000	\$35,000	\$275,000
						Sales Exp				\$1,375,000
						Market Research				\$50,000
						Advertising				\$200,000
						Promotion				\$150,000
						Quality				\$150,000
						R & D				\$100,000
						Total Marketing				\$2,025,000
						Interest				\$285,000
						Depreciation				\$420,000
						Total Finance				\$705,000
						Training				\$20,000
						Incentives				\$0
						Indirect Payroll				\$207,000
						Benefits				\$225,000
						Total HR				\$452,000
						General & Admin				\$1,000,000
						Total Indirect				\$4,312,000
						Total Expenses				\$11,332,000
						Tax				\$435,750
						Expected Profit				\$1,016,750
						Return on Sales				8.0%