INSTRUCTOR'S MANUAL

ENTERPRISE
An Integrating Management Exercise

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ENTERPRISE is an integrating management exercise. This means that it provides a vehicle to illustrate concepts from competitive strategy, marketing, production, and statistics. But it illustrates these concepts in a flexible manner.

Flexible

Some instructors will want to use all of ENTERPRISE’s capabilities to illustrate a variety of management concepts. Other instructors will want to illustrate specific concepts and keep the other concepts in the background. Still other instructors will see ENTERPRISE as a means to provide students with a rich background in which to practice general management skills.

ENTERPRISE can be extremely challenging. Student teams that understand the management concepts will do extremely well. However, even if a team muddles through, it will learn from its experience and gain a basic understanding of effective management in a complex environment.

ENTERPRISE can be used in a competitive strategy course, a marketing course, a production course, or an integrating course. It can be used also at the beginning or at the end of a management program as a “flight simulator” to give students experience and feedback on that experience. Its use depends upon the concepts that the instructor wishes to emphasize.

With ENTERPRISE you can assign four (or fewer) teams to a world. You can assign as many worlds as you want. You can assign names that are relevant to your students.

ENTERPRISE teams start more or less equally with counterbalanced advantages and disadvantages. The features of menu driven software and automated data transfer via diskette (or electronic mail) means rapid response to student decisions. You can run short simulations of only a few periods, say from one class session to the next, or extremely long simulations over a quarter or a semester.
You set up an ENTERPRISE world with the Setup module of your instructor’s software. Its name and the names of the teams are the names you choose. (We provide some examples in Appendix 3.)

**Markets.** The six markets of an ENTERPRISE world are called robotics, sound equipment, wood stoves, detergents, facsimile, and razzlets. In many ways they operate like real markets. In some ways they are simplified to enhance the pedagogy. (For example, the prices, costs, etc. are of roughly the same magnitude across markets to allow you to compare and contrast performance. In this way bookkeeping does not interfere with pedagogy.)

Each student team begins with a product in each of two markets. Overall, the robotics, sound equipment, wood stove, and detergent markets begin with two products. The facsimile and razzlets markets begin with no products. They represent opportunities.

**Balance.** In any given market each student team faces certain advantages and disadvantages. Some of these advantages and disadvantages are due to their starting positions. Others are due to the underlying production cost structure which, for each team, favors different product formulations.

However, these advantages and disadvantages are balanced. Teams begin with approximately the same total profit and potential. How well they do at the end depends upon their management savvy. You can consider total profit as one means by which to measure performance.

Indeed, in beta tests of ENTERPRISE, the student teams that were judged by the instructors to be the better teams did achieve the higher scores.

**Decisions.** The marketing related decisions that students make are:

- position—the amount of benefits to offer customers,
  e.g., quality and versatility for the sound equipment market.
- price
- advertising spending
- marketing research
  - advertising experiments
  - new product concept tests.

The production related decisions that students must make are:

- quantity to produce in each market
- raw materials to order (overall—materials are interchangeable between markets)
- when to order (students can carry inventory).

Additional strategic decisions are:

- which markets to enter and when to enter
- how to read competitors’ intentions.
Hardware Considerations

ENTERPRISE is designed to run on any IBM or IBM-compatible personal computer with at least 128K of memory and running under DOS 2.0 or later. Because the ENTERPRISE instructor's software (automatically) reads or writes 33 files for every ENTERPRISE world, we strongly recommend that the instructor use a system that has a hard disk. This includes personal computers similar to the PC/XT, the AT, and the PS/2. ENTERPRISE will draw positioning maps and taste diagrams and plot cumulative histories, but these plots do not require a graphics card or a graphics monitor.

ENTERPRISE will run on either a regular monitor or a color monitor. If you have a color monitor, answer Y to the first prompt, and subsequent screens will be in vivid colors. For your convenience, each market appears in a different color during the market simulation.

The cumulative plots will run on either a regular monitor or a color monitor, but we recommend a color monitor. Each team is plotted in a different color. Thus, you can see at a glance the relative standing of each team. (For monochrome monitors, each team is plotted with a different symbol. The information is still there but it doesn't leap out at you.)

ENTERPRISE is available in either a 5¼" diskette format or a 3½" format. Because you will be transferring files to and from your students it is a good idea to check whether the diskette drive(s) on your machine are compatible with the diskette drives on their machines. You should check both the size of the diskette and whether it is high or low density.

Loading the ENTERPRISE Software onto Your Hard Disk

First back up your instructor's diskette and your copy of the student diskette as described in the next section. Then:

1. Create an ENTERPRISE directory. Change to the root directory by typing `CD \` and pressing enter. Make a directory by typing `MD EP` and pressing enter. Change to that directory by typing `CD \EP` and pressing enter.
their files to your hard disk you can back up their files by returning to
DOS and typing COPY *.ENT *.n where “n” is the number of the period
you have just loaded.

Running ENTERPRISE: The Instructor’s Menu of Options
For details on how to run the instructor’s software including setting up
ENTERPRISE worlds, transferring files to and from students, running the
market simulations, and analyzing cumulative results, see chapter 3.

Some Error Messages
There are three types of error messages that you are likely to encounter.

Redo from start. This is a message to tell you that you have entered
a name when you should have entered a number or a number when you
should have entered a name. It may also appear when you try to enter too
many or too few data items. (Data items are separated by commas.) Just
re-enter the name or number in the appropriate format. You do not have
to restart ENTERPRISE.

Input past end at address . . . This message means that ENTERPRISE
expected more information from a file than was available. It means that
the file was damaged. If this happens, it may mean that a student team
has given you a damaged file.

File not found in module E . . . at address . . . This message means
that ENTERPRISE could not find an input file. It occurs if you enter a name
for a world that you have not yet created. If you made an input error, type
EMENU, press enter, and try again. If this does not work, check to be
sure that the input files are available on your default drive (type DIR and
press enter). Copy them to the default drive or change the default to the
drive that they are on. If all else fails, you can always use the setup
module to create a new world.

The System Hangs. We have tried to anticipate potential errors. The
software contains a number of built-in error trapping routines. In most
cases, any errors that we have not anticipated should simply place you at
the DOS command level. In this case type EMENU and press enter. In
rare cases the system might hang, that is nothing will happen and the
system will not respond to prompts. You can get out of this situation by
either re-booting or turning the machine off then on. You should not lose
data files if you do this.
This chapter describes how to use the ENTERPRISE instructor’s software. Chapter 4 gives details on how the ENTERPRISE worlds work and chapter 5 gives hints on pedagogy. Chapter 6 answers questions on why certain decisions were made in the design of ENTERPRISE.

The Main Menu

To begin the Instructor’s Menu of Options first change to the ENTERPRISE directory by typing CD \ EP and pressing enter. Next type EMENU and press enter. ENTERPRISE will load and execute the main menu.

To select any of the options simply strike the number of the indicated option. ENTERPRISE will load and run that option.

After you have completed running the chosen option, ENTERPRISE will return to the main menu. You can run an option as often as you like and you can run the main menu as often as you like. If, inadvertently, you return to a DOS level command, simply restart the main menu by entering EMENU.

Setting Up ENTERPRISE Worlds

Select option 1, SETUP, from the Instructor’s Menu of Options. ENTERPRISE will load the setup programs and describe the syntax for selecting world names and firm names. Enter the names at the prompts or choose the defaults. You can create as many ENTERPRISE worlds as you want as long as they have different names. Each time you create a world, you must run the setup program.

World Name Syntax. You can select any name that you want for the name of an ENTERPRISE world as long as it is twelve letters or less. You can use any combination of letters and numbers but please avoid spaces, commas, periods, or special characters that DOS will not accept for file names. The first three characters of a world name must be unique because ENTERPRISE stores the cumulative history of a world in a file that is based on the first three characters of the world name.
option strike the **spacebar** at the prompt for a disk drive letter. (In this case the enter key is not equivalent to the spacebar. If you inadvertently strike the enter key rather than the spacebar, ENTERPRISE will prompt you. Just strike the spacebar to continue.)

**Running the Market Simulation**

Once you have loaded the relevant student files, select option 3, **MARKET SIMULATION**, from the Instructor’s Menu of Options. ENTERPRISE will load and execute the market simulation program.

At the prompt, enter the name of the world whose markets you wish to simulate. ENTERPRISE will read the input files and run the simulation.

The market simulations do not take long to run. For each market a simulation takes less than a second on a PS/2-80, a few seconds on a PC/AT, and about 10 seconds on a PC/XT. Market simulations are run for all six markets and for each concept test that students request. (You can skip the latter in demonstration mode.)

After running the simulations, ENTERPRISE will print the results to the student files on your hard disk. You will need to use the **FILE MANAGEMENT** option to transfer these files to student diskettes.

You will need to run a market simulation for every ENTERPRISE world in your class.

**Preview of Student Results.** After the simulations are run, ENTERPRISE gives you the option to view any or all of the student results. Just indicate the market(s) and firm(s) you wish to review.

**Hard Copies of Student Results.** ENTERPRISE gives you the option of obtaining hard copies of the student results. This option is useful if you want to obtain a permanent record for class discussion. You can obtain up to nine copies if you wish to hand them out to the teams.

**Reviewing Cumulative History**

ENTERPRISE is a competition that is run over a number of periods. As students learn about the ENTERPRISE markets and about one another, their strategies will evolve. Past history will influence future moves.

Tracking the student's cumulative experience is a key part of the ENTERPRISE pedagogy. With cumulative histories you can see one team respond to another, you can see teams adjust inventories and/or marketing variables, you can uncover multi-period strategies. To assist you in this task, ENTERPRISE provides a program to record and plot cumulative histories.

To review and plot the student strategies and the market simulation results for all periods, select option 4, **CUMULATIVE HISTORY**, from the Instructor’s Menu of Options. ENTERPRISE will load and execute the cumulative history program.

At the prompt, enter the world name. You can then select those teams and those markets you wish to view. (All teams and all markets is an option.)

The following menu then will be displayed.
If you want to hand these out to your students or post them on your office door use the PRINT-SCREEN option on your personal computer. (On some computers you can print what is on the screen by pressing the "Print Screen" key. On other computers you must press the "Prt Sc" key while holding down the shift key.)

**Perceptual Map Evolution.** This option will plot a perceptual map (also known as a value map) for each market selected. Points are plotted in the following format:

A, B, C, or D indicate the firm (if it is in the market)

0, 1, 2, 3, ... indicate the time period.

For example, A0 indicates the opening position of the ...STAR firm, say ENTSTAR. A1 indicates its position in the first period.

ENTERPRISE will draw the axes and place the firms period by period on the map. If a firm keeps the same position only the latest period will be shown. See Figure 2. (ENTERPRISE pauses between periods, you must strike a key to continue.) If you have a color screen each firm will appear in a different color.

If you want to avoid the pauses between periods select the fast plot option by striking F at the appropriate prompt.

**Tables of Research Selected and New Product Entry.** This suboption prints a table which indicates when a firm entered a market and which research (advertising and/or concept tests) were selected and when. You can use this table to (1) determine quickly how crowded are markets, (2) identify teams which are aggressive in new product development, and (3) identify teams which under-utilize or over-utilize market research.

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**Figure 2. Example of Perceptual Map Evolution**
Table 1: Example Summary Table for the Robotics Market

<table>
<thead>
<tr>
<th>ROBOTICS</th>
<th>ENTSTAR</th>
<th>ENTINC</th>
<th>ENTWIZ</th>
<th>ENTCOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRICE</td>
<td>10.61</td>
<td>4.81</td>
<td>9.12</td>
<td>1.95</td>
</tr>
<tr>
<td>ANGLE OF ATTACK</td>
<td>90.00</td>
<td>46.82</td>
<td>21.45</td>
<td>6.71</td>
</tr>
<tr>
<td>BEST ANGLE</td>
<td>90.00</td>
<td>50.00</td>
<td>20.00</td>
<td>0.00</td>
</tr>
<tr>
<td>RADIUS</td>
<td>14.13</td>
<td>7.13</td>
<td>11.22</td>
<td>3.80</td>
</tr>
<tr>
<td>ADVERTISING</td>
<td>2.56</td>
<td>1.22</td>
<td>3.28</td>
<td>0.33</td>
</tr>
<tr>
<td>PROD. COST</td>
<td>8.84</td>
<td>6.83</td>
<td>8.48</td>
<td>1.32</td>
</tr>
<tr>
<td>SALES</td>
<td>13.68</td>
<td>13.00</td>
<td>20.12</td>
<td>2.36</td>
</tr>
<tr>
<td>SHARE</td>
<td>27.83</td>
<td>26.44</td>
<td>40.83</td>
<td>4.79</td>
</tr>
<tr>
<td>PROFIT</td>
<td>7.34</td>
<td>1.66</td>
<td>8.48</td>
<td>-1.03</td>
</tr>
</tbody>
</table>

All of the strategies and outputs in Table 1 are averaged over the periods in which the team was in the market. Most of the entries are self explanatory except for the three positioning summaries, the angle of attack, the best angle, and the radius.

Firms enter their positions as the amount of each of two benefits, say Quality and Versatility, that they offer to the market. To compare positions among teams, it is often best to think in terms of angles and radii. Suppose that you draw a line from a firm’s position to the origin. The “angle of attack” is the angle (in degrees, say 10°) that that line makes with the horizontal axis. You will find that teams will tend to differentiate by finding an angle of attack and then moving in or out along that angle. For example, one team might choose an angle that favors quality, another team an angle that favors versatility, with the third and fourth teams somewhere in between.

The “best angle” refers to the cost structure. As explained in the next chapter, for each team and for each market the cost structure favors one direction. Naturally, teams will tend toward this best angle. However, they need not be right on it. Competitive considerations could force them off of it. On the other hand, if they are far from the best angle, you can infer that they did not understand the cost implications of positioning.

The “radius” refers to how far they are out along the angle of attack. Larger radii are more aggressive and more costly. However, the largest radius does not always mean the largest market share. Market share depends on the “per dollar” position which is reflected by the radius divided by the price.

**By Variable.** If you select option 2, **VARIABLES** one at a time for all markets and teams, you will be shown a menu such as the following. To select one of the ten variables that are available, press the number of the variable. You can return to this menu as often as you like to create tables.
Names and Purposes of the Data Files

Most ENTERPRISE data files have the extension .ENT. We have tried to write the software so that you do not have to be aware of the detailed files. However, should a file get lost or damaged, you will be better able to correct problems if you know the names of the files and their functions.

Suppose that a world’s name is ENTERPRISE, then the file that contains the name of all of the firms in that world is ENTERPRISE.ENT. If a world’s name is WORLD1, then the file will be named WORLD1.ENT. You get the idea. Your students will need this file to select their strategies. It will be created with the setup option and transferred to the students’ disks with the file management option.

The results of a period’s competition will be contained in three files. For example, if a firm’s name is Entity, ENTITY1.ENT will contain that firm’s strategy as well as resulting costs, sales, and profit, ENTITY2.ENT will contain the results of any advertising tests, and ENTITY3.ENT will contain the results of any new product concept tests. (If the firm’s name is FIRMABC, then these files will be called FIRMABC1.ENT, FIRMABC2.ENT, and FIRMABC3.ENT.)

These files will be created whenever you run the market simulation. After you run the simulation you will need to use the file management option to transfer the files to the student diskettes. (You can do this without worrying about the detailed names of the files. ENTERPRISE will keep track and transfer the correct files automatically.)

The students’ strategies are contained in two files. If a firm’s name is Entity, ENTITY2.ENT, will contain that firm’s strategy (advertising, price, quantity, position, research requests, new product entry, etc.) and ENTITY3.ENT will contain the positions and prices of the concepts if the student team requests new product concept research.

These files will be on the diskettes that the students turn in to you. They can be transferred to your hard disk (automatically) by the file management option and will be read as input by the market simulation.

If a world’s name is ENTERPRISE, then the cumulative results for that world are contained in the file named ENTERPRISE.CUM.ENT. If the world’s name is WORLD1, then the cumulative file will be called WORLD1.CUM.ENT. Only one cumulative file is needed for each world. You can see by the syntax why the first three letters of a world name must be unique.

The cumulative history option will read the cumulative file automatically. The market simulation will update this file after each running of the simulation.

You will also find files with the extension .EPB. These are backup files for the files that are read by the student program. For example, ENTITY1.EPB is a backup file for ENTITY1.ENT. Its purpose is to allow the students to re-enter ENTERPRISE at any time to update their strategies. The .ENT file is updated, but the .EPB file is not. Thus, if the students want to reset their strategies they can do so. When they select the reset option, ENTERPRISE will read the .EPB file rather than the .ENT file.
Before you read this chapter, please review chapters 4 and 5 of the student manual. The student manual gives the basics of the ENTERPRISE worlds. This chapter reiterates some of the key structure and provides details that are not available to the students. Appendices to this instructor's manual give key equations for the ENTERPRISE worlds.

**How a Product's Sales Are Determined**

One of the decisions that the students must make is the quantity to produce. If a team produces less quantity than it can sell, then the "excess demand" will be reallocated to those teams that have the capacity to meet the demand.

We begin by explaining the basic method of determining the demand for a team's product. In this description we will assume that every team produces at least as much as is demanded. We will then explain how excess demand is reallocated.

**Sales Equation.** To enhance pedagogy, in particular to make it easier to teach response analysis, ENTERPRISE is based on a separable sales response. That is, sales are given by:

\[
\text{sales} = (\text{market volume}) \times (\text{advertising response}) \times (\text{positioning effect})
\]

This sales response simplifies some analysis, but it is not unrealistic. For example, see discussion in Little (1979).* There are a large number of competitive interactions in ENTERPRISE so the separability of the sales response seems justified.

To make the market simulations more realistic, a random error of up to ±20% is added to the sales. This error represents events that were not forecast such as the impact of economic trends, presidential elections, foreign policy, OPEC, etc.

**Advertising Response.** The advertising effect is based on a response function as illustrated in Figure 1 of the student manual. We have built in
ENTERPRISE computes the positioning effect by dividing the market into 90 segments. Each segment corresponds to an angle, $\alpha$, from 0° to 90°. The tastes of a segment are given by the slope of a line which makes an angle of $\alpha^\circ$ with the vertical axis. For each segment ENTERPRISE uses the corresponding weights to compute the utility for each product in the market. The higher the utility of a product, the more likely that segment’s customers are to buy that product. (There is also a “reservation price effect.” If all position/price combinations give low value, then many customers will choose no product.) The positioning effect is then computed by summing these probabilities across segments. Detailed equations are given in the appendix.

The previous paragraph is a bit technical. What it means is that products that are positioned further out on the value map will get a larger share of the market. (Further out will mean a larger radius to price ratio. See description in the Summary Tables section of chapter 3.)

Positioning relative to competition is important. For examples, read the discussion following Figure 2 in the student manual.

Once ENTERPRISE computes this positioning effect, which is known in the marketing literature as the “unadjusted share,” it multiplies the share times the advertising response and market volume as given by equation 1.

**New Product Concept Tests.** ENTERPRISE uses the same computation method for the new product concept tests (and the “what-if” analyses.) The product concepts are placed on the value map one at a time and the above computations are carried out. Thus the predicted sales for the new product are the sales that it would attain if (1) it were the only new product in the market, (2) competitors do not change their positions, and (3) the advertising response were 1.00.

By selecting the six concepts carefully, students can get reasonable estimates of the response to positioning of demand and of cost. If they understand how to use positioning maps—position with value better than competition for one or more market niches—then they will choose the concepts intelligently. For example, they should spread the concepts out according to the angle of attack (see chapter 3). Concepts with angles of 0°, 15°, 30°, 45°, 60°, and 75° are one way to spread the concepts around. They might also want to vary the radii to find out how the cost structure varies with distance from the origin.

As in real markets the cost information may prove to be easier to use than the demand information. An error is built into the cost estimates, but this error is only $\pm 20\%$. No errors are built into the demand estimates other than those due to competition. But the errors due to competition are much more difficult to predict. If a competitor does not produce enough to meet its demand, a concept’s sales can be much larger than estimated. If a competitor makes an aggressive change in positioning, price, or advertising, a concept’s sales can be much lower than estimated.

Be careful, students may be frustrated by this uncertainty. It is natural and it is real. It represents what happens in real markets. If you monitor student reaction, any frustration can be turned to your advantage as you direct the frustration to help the students understand better the caveats of forecasting.
20° away from the vertical axis.) The cost structure is also balanced for those teams without products in the “existing” markets and for the “new” markets.

In the course of an ENTERPRISE competition it will be extremely important for student teams to recognize that there are differential cost advantages. To drive this lesson home, ENTERPRISE only allows a firm to reposition a product by at most 20% per period. Thus, if a team chooses a poor initial position, they will place themselves in a hole from which it will take a number of periods to recover.

Teams can get an initial idea of their cost structure by ordering new product concept tests for the markets that they are not now in. If they spread the concepts out on the value map, they can identify the general area of the value map that is favorable from a production cost standpoint.

Table 3: Favored trade-offs for Production Costs

<table>
<thead>
<tr>
<th>Market</th>
<th>⋅⋅⋅ STAR</th>
<th>⋅⋅⋅ INC</th>
<th>⋅⋅⋅ WIZ</th>
<th>⋅⋅⋅ COM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robotics</td>
<td>90°</td>
<td>50°</td>
<td>20°</td>
<td>0°</td>
</tr>
<tr>
<td>Sound Equipment</td>
<td>70°</td>
<td>0°</td>
<td>90°</td>
<td>40°</td>
</tr>
<tr>
<td>Wood Stoves</td>
<td>40°</td>
<td>90°</td>
<td>0°</td>
<td>70°</td>
</tr>
<tr>
<td>Detergents</td>
<td>0°</td>
<td>20°</td>
<td>50°</td>
<td>90°</td>
</tr>
<tr>
<td>Facsimile</td>
<td>90°</td>
<td>30°</td>
<td>60°</td>
<td>0°</td>
</tr>
<tr>
<td>Razzlets</td>
<td>60°</td>
<td>0°</td>
<td>90°</td>
<td>30°</td>
</tr>
</tbody>
</table>

(Firm’s starting positions are given in boldface type.)

Once a team has a product in a market, they can use the “what-if” feature to map costs in the neighborhood of their current position. Naturally, if they reposition, they can map costs in the neighborhood of their new position.

If you want to plot isocost curves for the students in the course of a lecture or a discussion, the isocost curves are ellipses with principle axes in the directions given by Table 1. The ratios of the axes are 3:1.

For an example of a plot of an isocost ellipse, see Figure 3 in the student manual. For examples of the equations see the appendix to this instructor’s manual.

Inventories and Ordering Costs

Finished Products. If a firm produces more product than it can sell, the excess products are placed in inventory for the next period. ENTERPRISE keeps track of these inventories automatically.

The inventory carrying cost is $0.15 per unit per period and does not vary across market.

If students improve their product by repositioning their product with increased benefit levels, then the products in inventory will not be as valuable to customers as those products produced with the higher benefit levels. On the other hand, the old inventory will not be worthless.
There is a cost of $500,000 for every set of advertising experiments and for every set of new product concept tests that they order. These costs are not substantial. It should be in their interest to order the research. On the other hand, the costs are substantial enough to prevent frivolous orders.

There is a cost of $500,000 every time the students reposition their product. This level of cost is reasonable with respect to the real world and is included in ENTERPRISE to encourage them (1) to think long and hard about the position that they select for a new product entry and (2) to prevent frivolous repositioning. This cost should encourage heavy use of the “what-if” feature. The inventory penalty of a 15% decline in old product inventory whenever the product is improved gives them another reason to be sure of any repositioning decision.

There are no costs for the use of the syndicated data and the “what-if” capability. The lack of costs should encourage the use of these features. Pedagogically, the “what-if” feature is a useful learning tool.

“What-If” Analyses

If students select the “what-if” feature, ENTERPRISE will run a market simulation for the strategy being considered. In other words, if they have already changed the price, position, or advertising using the ENTERPRISE market menu, then the market simulation will be run for that price-position-advertising strategy.

The “what-if” calculations of sales and production costs are done in the same manner as for the actual market simulation. However, to make life interesting an error of up to ±20% is added to the production cost estimates. (These errors are set each time the program is run, not each time the “what-if” analyses are run. Thus, students can not run the “what-if” analyses over and over to get an estimate of the true value. They can do this only if they restart the program each time.)

The “what-if” analyses will prove extremely valuable to the student teams, but the analyses will not replace good decision making. There are two important caveats that students must understand when using the “what-if” analyses.

First, the “what-if” analyses assume that competition will do next period what it did last period. This will be true only if the other student teams are napping or if the market has reached equilibrium. In the early periods of a competition, other teams should have the incentive to improve their profitability. This is likely to mean changes in the price and the positions of existing products and the entry of new products. If competitors are aggressive, then this caveat should lead to an overestimate of sales potential. Only in the late periods of a competition is the market likely to reach an equilibrium where all teams are satisfied with their strategies.

The second caveat is that the “what-if” analyses assume that everyone produces enough quantity to meet demand. If competitive teams misjudge demand and produce too little, then the “what-if” analyses will underestimate sales.
With the ENTERPRISE integrating exercise students learn by experience. On one hand the ENTERPRISE markets are sufficiently complex to challenge students. On the other hand some aspects have been simplified so that complexity does not interfere with pedagogy. In many ways the best way to proceed is to trust the students. Pride, if nothing else, will motivate them to do well. As they compete, they learn about the marketing and production aspects and they learn about what it means to set strategy in the face of competitive response.

Feedback Sessions

However, the ENTERPRISE experience can be enhanced greatly by instructor intervention. Students want to do well and will come to you with questions. You should schedule discussion sessions between you and your students or between your teaching assistant and your students.

By asking questions of students you can lead them to consider how competitive response affected outcomes, how they can interpret competitive motivation, how they can use new product concept tests intelligently, how they can overcome past mistakes, etc. Without such feedback sessions students could become frustrated when the outcomes do match expectation.

You should also be aware of the video game effect. ENTERPRISE is designed to be easy to use. Sometimes it is too easy to use. Students can set strategy with little thought. In most cases they will be outwitted by competitive teams and will be forced to come to grips with the workings of the markets. However, in some cases they will muddle through. By giving them feedback and by challenging them to explain their strategies you can force more active learning.
maturing markets. Each team will seek to optimize its strategies with respect to competition.

If they ignore competitive response, they could ultimately reach an equilibrium.* If they become too aggressive, the market will deteriorate into price-positioning wars. If they make rational conjectures about how competition reacts, the market will trend toward a more cooperative equilibrium. In any case you can develop lively class discussions—especially if some worlds tend to be more cooperative than others.

During this phase of the competition students should understand the workings of the market and the marketing and production concepts that it represents. Their main focus will be competitive response.

**The Endgame.** If you announce in the beginning that the competition will run a fixed number of periods, then the competition will enter an endgame stage as this end approaches. In this stage teams will run down inventory. The markets are likely to become less cooperative when teams cease to have long term incentives.

Some instructors will welcome the endgame because it gives them a chance to discuss endgame phenomena and relate such phenomena to incentives that managers face at the end of their tenure in a position.

Other instructors will wish to avoid the endgame. There are at least two ways to avoid the endgame. One method is to have a random end to the game. After each period (beyond a certain point) you select a random number. If the random number exceeds a cutoff, stop the game. As long as the probability of continuing is sufficiently large, the endgame effects should disappear. See Axelrod (1984). Another way to avoid endgame effects is to announce a game of a fixed length, but stop it a number of periods early.

**Rewards: How to Set Student Goals**

**ENTERPRISE** is balanced in terms of initial position and potential. Thus, total profit is one way to judge outcomes. Certainly students will use this metric as one way to judge themselves.

There is an issue of how to weight time periods. Some instructors will want to use a discount rate. The logic behind such a discount rate is that net profits earned in early periods could be invested at % interest and grow over the course of the game. By the same token, if a team runs at a loss for a given period they would need to borrow funds and pay interest on those funds at a rate of % percent. For simplicity you can use the same discount rate for profits as for losses.

You can then use the standard formula to weight profits over the periods of the competition. That is,

\[
(4) \quad \text{Total profit at } T = \sum_i (\text{profit in period } i) \times (1 + r)^{T-t}
\]

where \( r \) is the discount rate, say 0.10, and \( T \) is the length of the game.

---

*For the mathematical model underlying the **ENTERPRISE** worlds it is possible to show that such a Nash equilibrium will exist in prices. For the price-positioning equilibrium it is less clear. There are incentives to differentiate, but the markets can deteriorate into price-positioning wars. See John R. Hauser (1988), “Competitive Price and Positioning Strategies” and John R. Hauser and Birger Wernerfelt (1988), “Existence and Uniqueness of Price Equilibria in Defender,” both in *Marketing Science*, 7 (Winter), 76-91 and 92-93.
The design of ENTERPRISE is based on extensive interviews with instructors in a variety of functional areas. Some of these instructors had experience with management games; others did not. A “beta” version was made available and used with different student groups. Version 1.0 represents a number of trade-offs that were made to satisfy the needs of instructors and to react to student comments on the beta version.

The source code is flexible. New features will be added as ENTERPRISE evolves. When these features are added we will include switches in the instructor’s software that will allow you to turn the features on or off. In this way you can tailor ENTERPRISE to your specific needs.

If you want us to add (or delete) features or if you want us to modify how ENTERPRISE works, please write to the author. To the greatest extent possible we want ENTERPRISE to enhance your pedagogy. We will try to respond.

So that you might understand our perspective, the remainder of this chapter addresses some of the design trade-offs that were made in ENTERPRISE. If your students raise these questions, you can use this chapter to formulate a response.

Why Are the Units Similar Across Markets?

Industrial goods like robots can cost hundreds of thousands of dollars. Detergents cost only a few dollars. In ENTERPRISE the prices are all in the range of a few dollars.

In demonstration tests it seemed that if the units varied widely, then there was unnecessary confusion as the users tried to translate between markets. Since we wanted to focus on more strategic issues, the units were standardized.
An issue related to positioning costs is the fact that if a product is positioned on one of the axes it will stay on the axis. Products can be repositioned by at most 20%. However, 20% of 00 is still 00. Students are warned about this issue and encouraged to choose new product positions that are flexible. In existing markets each team has exactly one product on a benefit axis. This should reinforce the lesson of flexibility.

**Why No Diffusion Phenomena?**

We expect that durable products such as wood stoves would go through a product life cycle of diffusion, saturation, and decay. This phenomenon could be added to the simulations.

We did not do so because we wanted students to focus on competitive issues of mature products rather than the transient issues of growing vs. declining markets.

You can tell students that the market is predominantly a replacement market which is less likely to be described by a Bass-like diffusion curve. Indeed, this is not an unrealistic description of many durable markets.

By the same token, we could have added market growth or seasonality. In general, ENTERPRISE is already quite complex. The addition of these phenomena runs the risk of unnecessary complication that would interfere with the pedagogy rather than enhance it.

If we have enough requests to add these phenomena as options we will do so in future versions.

**Other Questions?**

As you run ENTERPRISE, you may encounter questions that this manual does not answer. We will attempt to answer pedagogical questions and other software related questions. Write down your questions and describe your student situation.—How many students? At what level? How many periods? In which course? Etc. Mail these to the author. He will try to answer your questions as rapidly as is feasible. If you need a very rapid response, the author’s BITNET address is JHAUSER@SLOAN.
Cost Summaries

Production Cost: Depends upon market and chosen position.

Advertising Cost: You select the amount to spend.

Repositioning Cost: $500,000 for a change in position. If a product is improved, the inventory of unimproved products is reduced by 15%.

Fixed Cost: $1 MM per market per period.

Research Costs

New-product concepts: $500,000 for a set of six concepts.
Advertising experiments: $500,000 for a set of sixteen.

Inventory

Finished products: $0.15 per unit per period.
Materials (M1 or M2): $0.10 per unit per period.

Ordering Costs

M1: $2 MM per order
M2: $2 MM per order
Emergency orders: Twice the above ($4 MM)

Materials

M1: $300,000 per 1 MM units.
M2: $300,000 per 1 MM units.

Syndicated Data: No charge per use. Part of overhead.

“What-If” Analyses: No charge per use. Part of staff overhead.
Suggestions for World Names

You can choose any name for an ENTERPRISE world up to twelve characters as long as it does not contain spaces, commas, periods, or special characters that DOS does not recognize. However, the first three letters should be unique to avoid two cumulative history files of the same name.

Here are a few suggestions:

<table>
<thead>
<tr>
<th>EUROPE</th>
<th>U.S.A.</th>
<th>CHINA</th>
<th>INDIA</th>
<th>AUSTRIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARS</td>
<td>VENUS</td>
<td>MERCURY</td>
<td>SATURN</td>
<td>PLUTO</td>
</tr>
<tr>
<td>BOSTON</td>
<td>CHICAGO</td>
<td>SEATTLE</td>
<td>DALLAS</td>
<td>NEWYORK</td>
</tr>
<tr>
<td>OAK</td>
<td>ELM</td>
<td>ASH</td>
<td>PINE</td>
<td>HEMLOCK</td>
</tr>
<tr>
<td>BLUE</td>
<td>RED</td>
<td>YELLOW</td>
<td>BLACK</td>
<td>GREEN</td>
</tr>
<tr>
<td>COFFEE</td>
<td>TEA</td>
<td>MILK</td>
<td>WATER</td>
<td>WINE</td>
</tr>
</tbody>
</table>
The sum in equation A5 applies only to those firms which have products in the market. If a firm does not have a product in the market, then $P_i(\alpha) = 0$ for that firm. The segment dependent constants in equations A4 and A5 are given by:

$$w_x(\alpha) = 1/[1 + \tan(\alpha)]$$
$$w_y(\alpha) = \tan(\alpha)/[1 + \tan(\alpha)]$$
$$\beta(\alpha) = B \cdot [1 + \tan(\alpha)]/[1 + \tan^2(\alpha)]^{1/2}$$

For enterprise, $B = 10$ and $\lambda = 0.50$.

For those who are interested, equation A5 is a logit approximation to a probit model. In the probit model the uncertainty comes from heterogeneity in customers' perceptions of $x_i$ and $y_i$. This uncertainty is modelled by a multivariate normal distribution.

Finally, the unadjusted share of firm, $s_i$, is given by

$$s_i = \{\sum_\alpha P_i(\alpha)\}/90$$

(A6)

where $\alpha$ is summed from $0^\circ$ to $90^\circ$.

Sales

If $S$ is the market size, then the sales of firm $i$ is given by equation A7 where A7 applies separately to each market. We index $s_i$ by time period

$$Sales = S \cdot R(t) \cdot s_i(t)$$

(A7)

Production Costs

If $\theta$ is the angle given by Table 1 in chapter 4, then production costs, $c_{ij}$, for firm $i$ in market $j$ are given by:

$$c_{ij} = [A(\theta)x_i^2 + B(\theta)x_iy_i + C(\theta)y_i^2] \cdot K$$

(A8)

where $x_i$ and $y_i$ give firm $i$'s position in market $j$ and $K = 0.03$. The values of the parameters of the isocost ellipses in equation A8 are given by Table A1.

Table A1. Parameter Values for Isocost Ellipses. (See Table 3 in Chapter 4 for the value of $\theta$ which corresponds to each firm/market combination.)

<table>
<thead>
<tr>
<th>$\theta$</th>
<th>$A(\theta)$</th>
<th>$B(\theta)$</th>
<th>$C(\theta)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0^\circ$</td>
<td>1.000</td>
<td>0.000</td>
<td>9.000</td>
</tr>
<tr>
<td>$20^\circ$</td>
<td>1.936</td>
<td>-5.142</td>
<td>8.064</td>
</tr>
<tr>
<td>$30^\circ$</td>
<td>3.000</td>
<td>-6.928</td>
<td>7.000</td>
</tr>
<tr>
<td>$40^\circ$</td>
<td>4.305</td>
<td>-7.878</td>
<td>5.695</td>
</tr>
<tr>
<td>$50^\circ$</td>
<td>5.695</td>
<td>-7.878</td>
<td>4.305</td>
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<tr>
<td>$60^\circ$</td>
<td>7.000</td>
<td>-6.928</td>
<td>3.000</td>
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<tr>
<td>$70^\circ$</td>
<td>8.064</td>
<td>-5.142</td>
<td>1.936</td>
</tr>
<tr>
<td>$90^\circ$</td>
<td>9.000</td>
<td>0.000</td>
<td>1.000</td>
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</tbody>
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A Software Companion to

ENTERPRISE

ENTERPRISE is designed to be compatible with the PC simulations in Applying Marketing Management (also published by The Scientific Press). In particular:

1. **Defender**, a positioning strategy simulation, prepares you for competition in those ENTERPRISE markets in which you already have a product. Use it to gain a deeper understanding of value maps and taste distributions.

2. **Robologic**, a new product-development simulation, prepares you for pricing and positioning decisions you will make when you enter the ENTERPRISE market. Using it teaches you how to use value maps to make decisions.

3. **Intergalactic Widgets**, a competitive strategy simulation, helps you to understand how your actions affect and are affected by competition. Concentration on one variable, promotion, allows you to isolate the implications of competitive reactions.