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Management Simulations, Inc.TM CAPSTONE[®] *Team Member Guide* 2005.

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WELCOME TO CAPSTONE®

From: Support Team at MSI

To: All CAPSTONE® Students

Subject: Simulation Objectives

Welcome to CAPSTONE®. In this simulation, your class will be divided into teams. Each team will be given a company to run. Your team will compete against other teams using a variety of success measures to benchmark results.

THE BASIC OBJECTIVE— learn how to run a company by running a company. Along the way, you will develop a strategy, execute tactics, analyze competitors, and integrate what you have learned about the functional disciplines in earlier classes.

THE PHILOSOPHY— if you want to learn how to dance, or play an instrument, or fly an airplane, at some point you must put theory into practice and just do it.

We, the Support Team, have played CAPSTONE® too, as students in a class similar to yours. Your initial thoughts might be similar to ours: “Where do I begin? What are the rules? What are my options?” It is our job to get you started. Each semester we coach over 20,000 students just like you through the process of forming a team and taking over the company.

You will find the process fun, challenging, but also a lot of hard work. You are up against students on other teams that are every bit as smart and ambitious as you.

Let's begin by listing your resources:

THE WEBSITE– CAPSTONE® is designed around the website. There you will find:

- The decision support spreadsheet, Capstone.xls
- Tutorials
- Animated demonstrations
- Reports
- Help files
- Automated analysis wizards
- Comparisons with other teams
- Email
- Conferences
- Homework assignments

THE GUIDE– This Team Member Guide is designed as a reference to the scenario and rules. We have made it as compact as possible because the primary resource is the website. This chapter tells you how to get registered on the website. Chapter 2 describes the scenario, Chapter 3, your company. Chapter 4 coaches you through a situation analysis.

YOUR TEAMMATES– Like any company, your group will assign roles and tasks to its members. You are a resource for your teammates, and they for you.

YOUR PROFESSOR– Some professors approach a simulation as a test. Others approach it as a coach. Most do some of both. While professors will not tell you what to do, they will generally help you frame a question properly and suggest places to look for answers.

THE SUPPORT TEAM– Please direct any technical problem to us. You can contact us via the Support Ticket system on the website, or by toll-free phone (please see the website for Support Center hours and phone numbers). Like professors, we cannot tell you what to do. We can answer any question about the rules or scenario, and we can explain outcomes.

The “CHECKLIST” on page 5 will take you through the next steps. Thank you for participating, and best of luck with the simulation!

The MSI Support Team

REGISTRATION

1. Write your Simulation ID Number here: C_____. Your professor might have provided this number. If not, don't worry. Just continue following these instructions.
2. Connect to the Internet and go to www.capsim.com.
3. Locate "Students Click Here to Register for the First Time."
4. Read the welcoming message then click the "Begin Registration" button.
5. Simulation ID Number:
 - If you know the Simulation ID Number, enter it in the text box and click the Continue to Step 2 button;
 - If you do not know the Simulation ID Number, click on your school name and (if necessary) your campus. You can determine the correct simulation by looking for the course name, number, your professor's initials or the start date. Locate your course and click the Register in This Simulation button.
6. Enter your personal information and select a password. Click the Continue button.
7. Select a User ID. You will enter your User ID and your password each time you log onto the simulation. Click the Submit User ID button.
8. Payment Method:
 - If you see a registration number inside the front cover of this book: Click the "I have a registration number" link, type the number into the text box, then click the "Complete Registration" button;
 - If you see "Please Pay Online" inside the front cover of this book: Click the "Purchase Online" link. You can pay with a credit card or checking account number. A secure, financial services company will process the transaction.

CHECKLIST

- Take the Introductory Lessons**
 - Log onto your account and click the Resource Materials link, then click Tutorials.
- Readings**
 - Quickly review "THE MARKETPLACE" starting on page 7 and "YOUR COMPANY" starting on page 14;
 - The *Team Member Guide* should be thought of as a reference book, not a textbook.
- Complete the Solo Rehearsal Rounds**
 - Download Capstone.xls: Log onto the website and click the Making Decisions link;
 - See "WEBSITE & SPREADSHEET OPERATION" for complete spreadsheet instructions;
 - Use Capstone.xls to print the *CAPSTONE® COURIER*, the sensor-industry newsletter. The *COURIER* has the starting conditions for the simulation. You will also need the *COURIER* for the Situation Analysis.
- Form a Team**
 - The first time you log onto the website, you will have an opportunity to join a team. Students are assigned to companies either by instructors, or you can form your own.
- Complete the Situation Analysis (page 27)**
 - This exercise is designed to help you quickly research your company and the industry environment before you start managing your corporation.

□ **Organize Your Team**

- The information starting on page 37 provides examples of how to organize your team. Keep in mind each person can have more than one role.

□ **Pick a Strategy**

- As a team, pick a strategy (See “SIX BASIC STRATEGIES” on page 39), or create your own. All the basic strategies have succeeded and failed. The true success will be achieved in the execution, so pick a strategy you will enjoy.

□ **Additional Support**

- Tutorials and Demonstrations– log on then click the Tutorials and Demonstrations links in the Resource Materials submenu;
- Support Center– to send us a question, click the Support Center link;
- By phone– Please see the website for Support Center hours and phone numbers.

ECONOMIC CONDITIONS

CAPSTONE® is not like the real world in one important respect: all companies start alike. Your situation could be compared to a monopoly that has been broken up by the government. Where once there was one large company, now there are up to six smaller, identical companies.

CAPSTONE® is designed this way for a reason. We want all strategic options to be available to you. You can decide to be a Cost Leader or a Differentiator. You can be a large company, or you can focus on a niche.

At the beginning of the simulation, each company generates \$100 million in sales. There are no outside competitors or product substitutes. A favorable economic environment features moderate growth, low inflation, and historically averaged interest rates. No economic downturns or other surprises are expected. In short, no excuses— *whatever happens as the market evolves will be driven by the tactical execution of strategies, not by external factors.*

THE PRODUCT AND CUSTOMER

Your products are sensors, devices that sense the environment. New sensor businesses are always being created. Today's emerging sensor industries include security applications and bio-metrics. Customers put your sensors into the products they manufacture. Two questions dominate their thinking. How big is the sensor, and how well does it perform?

The customer wants smaller sensors (resulting in a trend towards miniaturization) and higher performance (resulting in a trend towards increased sensitivity and speed). Over time, the customer expects smaller, more powerful products.

Figure 2-1 on page 8 illustrates the placement of five groups of customers on a Perceptual Map. A Perceptual Map indicates where customers' buying preferences are located.

For each segment, customers undergo a two-stage buying process. The first stage is known as the Rough Cut and the second, the Fine Cut.

FIVE MARKET SEGMENTS

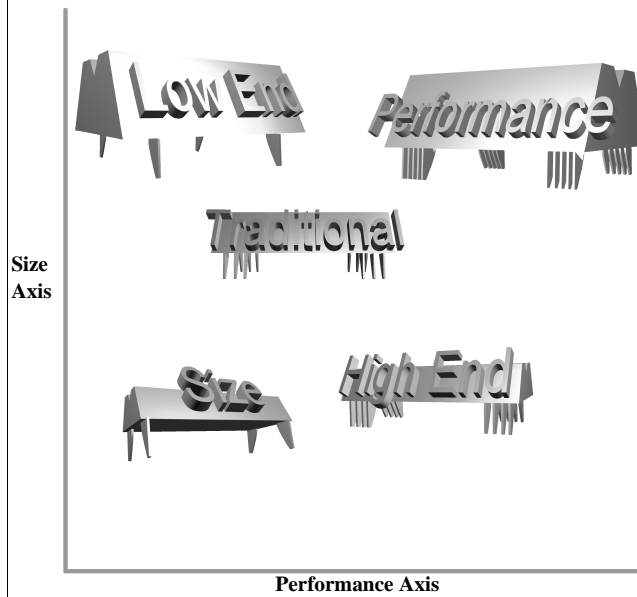


FIGURE 2-1 Products for each segment have different size and performance specifications. For example, High End customers want small, high performance sensors, while Low End customers expect large, low performance sensors.

You serve five customer groups or market segments. Each segment is named for its purchasing concerns:

- **Traditional:** 32.4% of market sales dollars. Traditional customers seek proven products using current technology;
- **Low End:** 31.1% of market sales. Low End customers seek proven products, are indifferent to technological sophistication, and are price motivated;
- **High End:** 15.3% of market sales. High End customers seek cutting-edge technology in both size and performance;
- **Performance:** 10.4% of market sales. Performance customers seek high reliability, advanced technology products, emphasizing high performance;
- **Size:** 10.8% of market sales. Size customers seek advanced technology products that focus on small size.

THE ROUGH CUT

In the Rough Cut, buyers focus on four product characteristics:

- **Performance:** Customer perceptions of how well the product performs;
- **Size:** Refers to the product's dimensions and weight;
- **Reliability:** Expressed in terms of Mean Time Between Failure, or MTBF;
- **Price:** Different price ranges are associated with each market segment, and distinguish one customer type from another.

Products must fall within segment guidelines to survive the Rough Cut. Each segment sets its own standards for performance, size, reliability and price.

PERFORMANCE AND SIZE

Performance and size are evaluated with a Perceptual Map, a marketing tool used

to compare products against customer perceptions (See Figure A-7 on page 60).

The Perceptual Map reveals how customers perceive similar products. Performance is scaled from 0 (low performance) to 20 (high performance) on the horizontal axis. Size is scaled from 0 (small) to 20 (large) on the vertical axis.

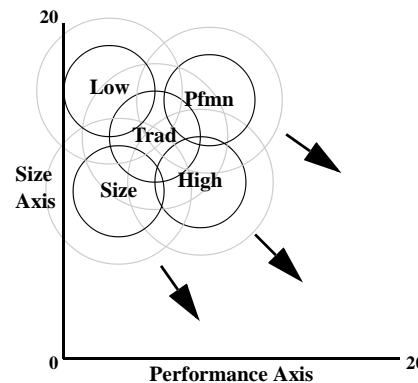


FIGURE 2-2 Segment Drift

The circles on the Perceptual Map represent market segments. A market segment is a group of customers with similar purchasing concerns.

The market segments currently are grouped in the upper-left quadrant, but as technology improves, customers will want sensors that are smaller and have higher performance (as indicated by the arrows in Figure 2-2). Segments drift in the direction of the arrows.

Products that plot within 4.0 units from the center of the circle survive that segment's performance/size Rough Cut. When products plot more than 4.0 units away, they fail the Rough Cut (see Figure 2-3).

As technology improves, customer expectations increase— they want smaller and faster products. These increased expectations cause the segment circles to drift towards the lower-right.

Tip: To remain competitive, products must stay within the segment circles. The Perceptual Map evolves throughout the year. A segment can approach a product or leave it behind. Plan your R&D projects so that products always lie inside a segment.

Segment drift rates average around 1.0 unit per year. The Low End segment moves

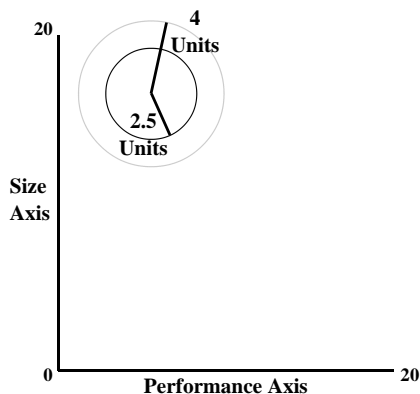


FIGURE 2-3 Products that fall within the inner circle pass the segment's Fine Cut. Products outside the outer circle fail entirely and make no sales. Products within the outer circle – but outside of the inner circle – make the Rough Cut, and have reduced demand.

slowest at about 0.7 units per year and the High End moves fastest at about 1.3 units per year (again, note the arrows in Figure 2-2). Movement occurs in monthly steps.

Market segments will not move faster to catch up with a product that exceeds their expectations. For example, High End customers will refuse to buy a product to the lower right of the Rough Cut circle. Customers can integrate into their designs only products that fall within their circle on the Perceptual Map.

PRICE

Each segment sets price guidelines, which further differentiate the segments. For example, Traditional customers do not expect to pay High End prices (Figure 2-4).

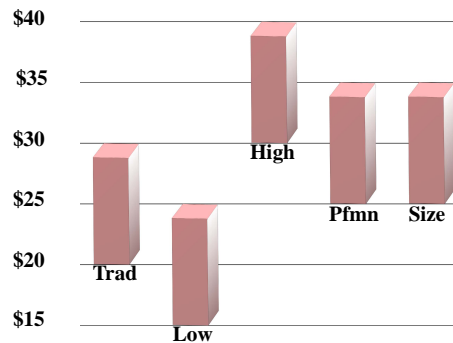


FIGURE 2-4 Price Range of Each Segment

Segment price expectations correlate loosely with the segment's position on the Perceptual Map. In general, as performance increases or size decreases, price ranges go higher.

PRICE IN A BUYER'S MARKET

In a Buyer's Market there is plenty of inventory for customers. Products must compete on their merits. A product priced \$1 above or below the segment guideline loses about 20% of its appeal. Products continue to lose approximately 20% for each dollar above or below the guideline, on up to \$5, at which point they lose all appeal. For example, last year Performance customers expected a price between \$25 and \$35. At \$36 a product's appeal falls by 20%. At \$39 a product's appeal falls by 80%, At \$40 customers refuse to buy the product under any circumstance.

PRICE IN A SELLER'S MARKET

In a Seller's Market there are inventory shortages. Products can be priced up to \$4.99 above the price range without losing any appeal. Customers dislike the price, but they must have something. However, at \$5 above the price range, products still lose all appeal. Sales drop to zero as customers find a substitute or do without.

Tip: Price ranges fall \$0.50 per year in every segment. Remember, the price ranges reported in the *CAPSTONE® COURIER* are for the previous round, not the round for which you are making decisions! Price expectations this round are \$0.50 lower than last year.

RELIABILITY

Reliability is measured with Mean Time Between Failure (MTBF). The MTBF conveys the number of hours a product is expected to function. Each segment has a different range of expected MTBF (see Figure 2-6 on page 11). For example, Traditional customers want products to last at least 14,000 hours before they wear out (Table 2-1).

TABLE 2-1 Reliability rough cut, minimum acceptable Mean Time Between Failure (MTBF) in hours

Segment	Min. MTBF (in Hours)
Traditional	14,000
Low End	12,000
High End	20,000
Performance	22,000
Size	16,000

RELIABILITY IN A BUYER'S MARKET

In a Buyer's Market (lots of inventory), a product with an MTBF 1,000 hours below the segment guideline loses about 20% of its appeal. Products continue to lose approximately 20% for every 1,000 hours below the guideline, on up to 5,000 hours, at which point they lose all appeal. For example, Performance customers expect an MTBF between 22,000-27,000 hours. At 21,000 hours a product's appeal falls by 20%. At

18,000 hours a product's appeal falls by 80%. At 17,000 hours customers refuse to buy the product under any circumstance.

RELIABILITY IN A SELLER'S MARKET

In a Seller's Market (inventory shortages) a product's MTBF can go 4,900 hours below the range without losing sales. However, at 5,000 hours below the range, products lose all appeal.

THE FINE CUT

Suppose there are 30 products scattered among the five segments. High End customers would disqualify most of these, leaving only those products that meet the High End's Rough Cut standards. These survivors enter the Fine Cut stage and are compared across four buying criteria:

- Positioning
- Reliability
- Age
- Price

POSITIONING

In the Fine Cut, a product's exact position within a segment circle increases in importance. Inside each Fine Cut circle, segments have an Ideal Spot where demand is at its highest (Figure 2-5).

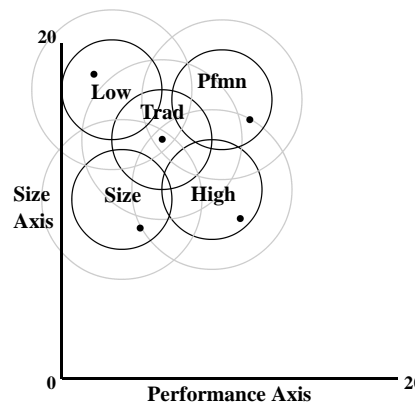


FIGURE 2-5 Ideal Spots locations. The dot in each segment indicates the highest concentration of customers.

Customers in the high technology segments (High End, Performance and Size) want cutting-edge products. The Ideal Spots in these segments are located towards the lower-right edge of the circles, where size is smaller and performance is faster.

The low technology segments (Traditional and Low End) want proven technology. Traditional customers concentrate in the center of the circle, while Low End customers concentrate towards the upper left.

Ideal Spots drift with the circle. See Table 4-2 on page 29 for exact coordinates.

Increasing performance and shrinking size will increase the cost of a product's material.

RELIABILITY

In the Fine Cut, customers prefer high MTBF ratings to low ones (Figure 2-6). However, if a product's MTBF is beyond the expected range, customers ignore the additional reliability.

Raising a product's MTBF will increase the cost of a product's material.

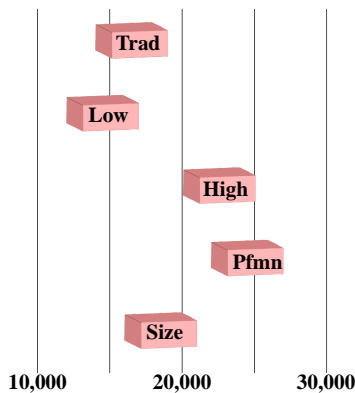


FIGURE 2-6 Mean Time Between Failure (MTBF) in hours

AGE

Age refers to the Perceived Age of a product. Some segments prefer newer products, others prefer older, proven products (see Table 2-2).

When a product is repositioned (moved on the Perceptual Map), its Perceived Age is cut in half. For example, suppose a product with an age of 3.6 years is moved. On the day it emerges from R&D customers mentally cut the age in half to 1.8 (see "R&D" on page 14).

Tip: In CAPSTONE®, the terms age and Perceived Age are used interchangeably.

TABLE 2-2 Preferred Product Age (in years) for Each Segment

Segment	Ages	Demand
Trad	1.5-2.5	Peaks at 2
Low	4.0-7.0	Peaks at 7
High	0.0-1.0	Peaks at 0 (new is best)
Pfmn	0.5-2.0	Peaks at 1
Size	1.0-2.0	Peaks at 1.5

Tip: In each segment, demand peaks at a different age. For example, in the Traditional segment demand peaks at 2.0 years. Products in that segment with ages of 1.5 and 2.5 would have the same level of demand. However, since sales occur every month, the product beginning the year with an age of 1.5 would have an advantage because, as the months progress, its age moves closer to the peak of 2.0; the product beginning the year with the age of 2.5 moves away from the peak.

PRICING

Price plays a role in both the Rough Cut and Fine Cut stages of the purchase decision. For products that survive the Rough Cut, demand for a product follows a classic economic demand curve: as price goes down, demand goes up (Figure 2-7).

Customers, however, also are concerned with the product design. A better product cre-

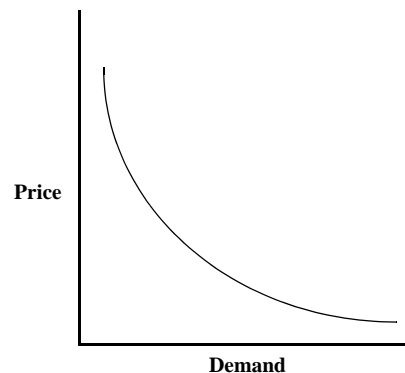
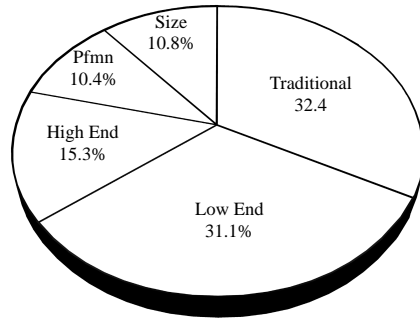
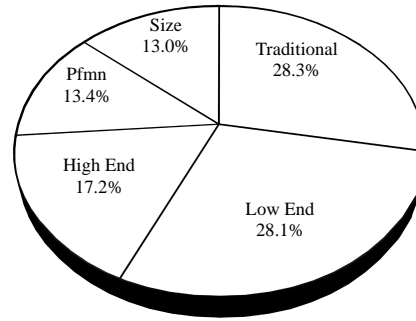


FIGURE 2-7 Classic Supply-Demand Curve: As price decreases, demand increases.



Current Market Share: Percentage in Dollars

FIGURE 2-8



Five-Year Forecast: Percentage in Dollars (Assumes prices will not decrease.)

ates higher demand, and this can be traded for a higher price.

For example, suppose that the design for product Able is superior to Baker's. If they were priced the same, Able would outsell Baker. But as Able raises its price, at some point its unit demand will be equal to Baker's demand. Able will trade off some of its potential demand for a higher price on fewer units. In general, the high technology segments (Performance, High End, and Size) are sensitive to design and can command a higher price. The low technology segments (Low End and Traditional) are less sensitive to design and place more of an emphasis on price.

Although all segments evaluate products against the four buying criteria, segments assign different importance to each. For example, price is most important to Low End customers and least important to High End customers. These priorities are summarized in Figure 2-9 on page 13.

MARKET SIZES AND GROWTH

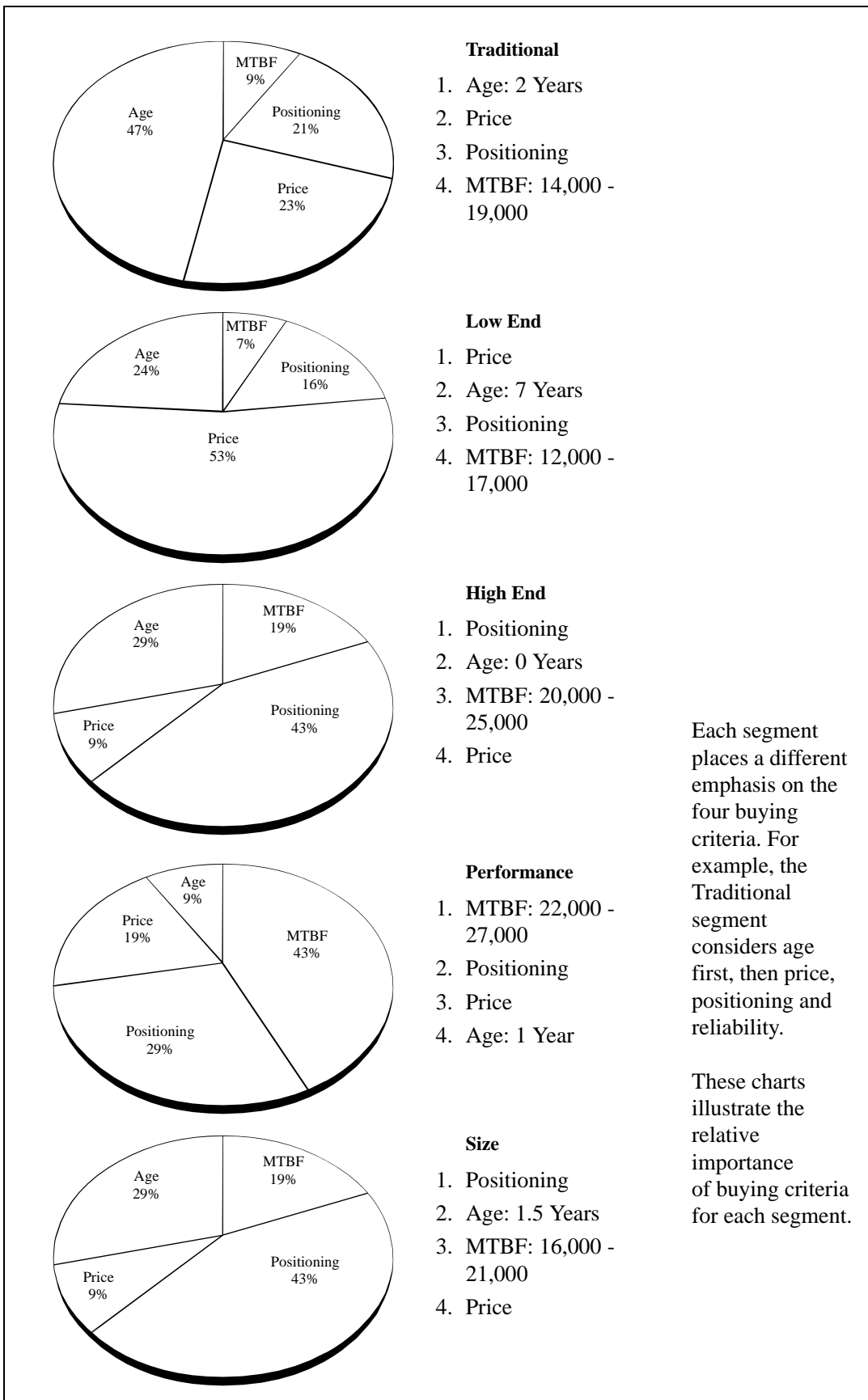
Market segments have different sizes and grow at different rates. Table 2-3 and Figure 2-8 summarize the relative sizes for the current year and the forecasted sizes five years from now.

For example, the Traditional segment is growing (in units) at 9.2% per year. The entire market, however, is growing at almost 14% per year. Because the Traditional segment is growing at a slower rate than average, five years from now it is expected to make up only 28.0% of the market, down from its current 32.4%. Over the same period, the entire market is expected to grow 85%.

Tip: The five-year dollar estimate in Figure 2-8 assumes prices will hold at their current levels, which is extremely unlikely. Unit prices will fall as the simulation progresses. Price pressure in the low technology segments (Low End and Traditional) tends to be greater than in the high technology segments (High End, Performance and Size).

TABLE 2-3

	Traditional	Low End	High End	Pfmn	Size
Current Size (in units)	32.4%	39.3%	11.2%	8.4%	8.7%
Size Five Years From Now (in units)	28.0%	37.0%	12.9%	11.2%	10.9%
Demand Growth Rate per Year	9.2%	11.7%	16.2%	19.8%	18.3%



- Traditional**
1. Age: 2 Years
 2. Price
 3. Positioning
 4. MTBF: 14,000 - 19,000

- Low End**
1. Price
 2. Age: 7 Years
 3. Positioning
 4. MTBF: 12,000 - 17,000

- High End**
1. Positioning
 2. Age: 0 Years
 3. MTBF: 20,000 - 25,000
 4. Price

- Performance**
1. MTBF: 22,000 - 27,000
 2. Positioning
 3. Price
 4. Age: 1 Year

- Size**
1. Positioning
 2. Age: 1.5 Years
 3. MTBF: 16,000 - 21,000
 4. Price

Each segment places a different emphasis on the four buying criteria. For example, the Traditional segment considers age first, then price, positioning and reliability.

These charts illustrate the relative importance of buying criteria for each segment.

FIGURE 2-9 Customer Buying Criteria

COMPANY ACTIVITIES

CAPSTONE® separates company activities into six areas:

- Research & Development (R&D)
- Marketing
- Production
- Finance
- Human Resources (Optional)
- Total Quality Management (Optional)

You and your competitors begin the simulation with five products each, one in each market segment. You have one factory per product. Products can be terminated or added. Your company must have at least one product at all times, and never more than eight.

Each round, you and your team will make annual decisions for your company. These decisions are made on the January 1. They are then executed by your employees. Industry results are published in the *CAPSTONE® COURIER*, which can be viewed from the website's Reports link and from the Last Year's Reports menu in Capstone.xls.

R&D

The R&D Department invents new products and changes specifications for existing products. Changing size and/or performance repositions a product on the Perceptual Map. Improving performance and shrinking size moves the product toward the lower-right of the map (see Figure 2-2 on page 8).

Your R&D strategy is fundamental to your marketing and production plans. In the marketing plan, R&D addresses:

- The placement of each product inside a market segment on the Perceptual Map;
- The number of products in each segment;
- The age of your products;

- The Reliability of each product (as indicated by its MTBF rating).

In the production plan, R&D affects or is affected by:

- The cost of material;
- The purchase of new facilities to build new products;
- Levels of automation for a product (and its labor cost).

All R&D projects begin on January 1. If a product does not have a project already underway, you can launch a new project for that product. However, if a project begun in a previous year has not finished on January 1, you will not be able to launch a new project for that product (the field boxes on the spreadsheet will remain yellow and locked).

There are three types of R&D projects:

1. Repositioning, which changes a product's performance or size or both, therefore moving the product from its current location on the Perceptual Map to a new one. MTBF ratings can be (but do not have to be) changed when a product is repositioned;
2. Reliability adjustment, which changes a product's MTBF without changing its position;
3. Invention, which creates a new product (see "PRODUCT INVENTION" on page 44).

MATERIAL COST

The relative cost of a product's material increases as:

- Size is decreased;
- Performance is increased;
- MTBF is raised.

This is because higher technology costs more. See "RELIABILITY AND POSITIONING COMPONENT COSTS" on page 34.

PROJECT MANAGEMENT

Segment circles on the Perceptual Map move at speeds ranging from 0.7 to 1.3 units each year. You must plan to move your products (or retire them) as the simulation progresses.

In general, the more you move a product or change its MTBF, the longer the project takes to complete. It typically takes 1.3 to 2.3 years to invent a product. When products are created or moved close to existing products, R&D completion times diminish. This is because your R&D Department can take advantage of existing technology.

Tip: Usually you want repositioning projects to finish in less than a year. For example, consider breaking an 18-month project into two separate projects, with the first stage ending just before the end of the current round, and the second ending halfway through the following round.

This will cut the product's age in half twice, give your product a better position for the first six months of the following round and allow you to fine-tune the product at the beginning of the following round.

A plant's automation level influences R&D completion time. The higher a product's automation rating, the greater the amount of time and money needed to revise the product. At an automation level of 1.0, products can move as much as 1.7 units on the Perceptual Map in one year. At an automation level of 10.0, moving 0.1 units on the map takes about 1.1 years. However, it is possible to move highly automated products several units on the map if the project spans several years.

R&D REVISION TIMES

R&D revision times will increase when teams put two or more products into R&D at the same time—when this happens *each* R&D project takes longer to complete. It is important to verify completion dates after all decisions have been entered.

Tip: If the Revision Date for a product is more than one year, the changes will not appear in the next *CAPSTONE® COURIER*. This is because the product is still in R&D.

PERCEIVED AGE

In *CAPSTONE®*, the terms age and Perceived Age are used interchangeably. Perceived Age is an important element in the

purchase decision (see Table 2-2 on page 11). When a product is moved to a new location on the Perceptual Map, the Perceived Age is divided in half.

Tip: Changing MTBF has no impact on Perceived Age.

To summarize, R&D projects for existing products can:

- Control product placement on the Perceptual Map. You can keep up with a segment's drift, or you can move your product to a different segment. Rapid movement requires low automation levels;
- Lower the Perceived Age of products;
- Change MTBF specifications to match the needs of the segment.

During the R&D period, products continue to be produced at their old specifications (size, performance and MTBF). On the Revision Date, the products begin production at their new specifications. Any units in inventory on that date are reworked to match the new specifications.

You can retire old products by selling off all the product's manufacturing capacity (see "SELLING CAPACITY TO TERMINATE A PRODUCT" on page 20).

You can create new products. New products are given a name, size, performance, and MTBF specifications. New products take a minimum of one year to invent (see "PRODUCT INVENTION" on page 44).

Tip: You must buy production capacity and automation for all new products. If you do not, you will not be able to manufacture them. It takes one year to purchase capacity and automation, therefore you need to purchase capacity and automation in the round prior to your product's release. See "CAPACITY AND AUTOMATION" on page 48.

See "R&D SPREADSHEET" on page 43.

MARKETING

Marketing is concerned with the 4 Ps:

- Price
- Promotion
- Place
- Product

PRICE

Price was discussed in CHAPTER 2 (see "PRICE" on page 9 and "PRICING" on page 11). In a Buyer's Market, demand quickly falls to zero when prices go above or below the expected price range. For example, in Round 1 of the simulation, Traditional customers expect a price between \$19.50 and \$29.50.

The expected price range behaves along a classic micro-economic demand curve (Figure 2-7 on page 11). Outside the range, demand quickly falls to zero. Price also drives the product's contribution to profit margin. Dropping the price increases demand but reduces profit per unit. Segment price ranges fall at a rate of \$0.50 per year. This puts pressure on companies to improve their cost structures.

PROMOTION

Promotion is driven by a Promotion Budget for each product. Promotion expenditures create awareness about the product that has both short term and long term effects.

When new products are invented, they are considered newsworthy events. awareness is created quickly with a public relations campaign. At launch you automatically are charged a \$250 thousand fee for marketing rollout and public relations. This fee earns a new product a starting awareness of 50%.

Tip: The \$250 thousand fee and the 50% awareness will not be reflected in the spreadsheet. They will appear once the round has processed in the *CAPSTONE® COURIER* and your Annual Report.

After launch, customers begin to forget your product. You lose one third of your awareness each year. Your Promotion Budget

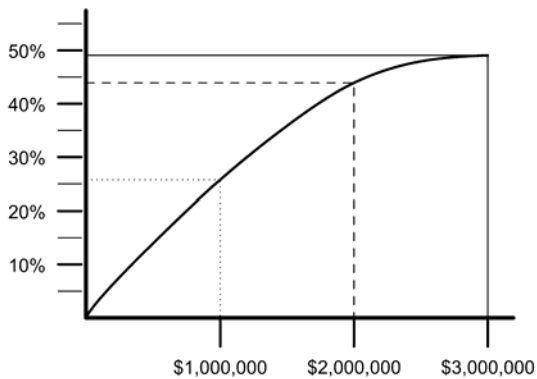


FIGURE 3-1 Increases in Promotion Budget have diminishing returns. The first \$1,000,000 (dotted line) buys approximately 26% additional awareness. The second \$1,000,000 (dashed line) buys only 18% more awareness.

creates new awareness to replace or even improve awareness.

However, promotion efforts are subject to diminishing returns. As an example, your first \$1 million would reach about 26% of customers (mostly replacing lost awareness.) A \$2 million Promotion Budget would reach an additional 18%, and a \$3 million budget only another 5% (Figure 3-1). This is because further expenditures tend to reach customers who already know about the product.

If you attained 100% customer awareness in the previous year, you would only need to create 33% new awareness to maintain 100% this year. This would cost approximately \$1.4 million. Any budget above that would be wasted.

Suppose no team promotes their products. Customers would rely upon their own research. Sales would be distributed based upon the merits of those products that pass the Fine Cut.

Suppose all products enjoyed 100% awareness. Again, sales would be distributed based upon the merits of those products that pass the Fine Cut.

Now suppose your product has not been promoted for many years while competitors

have aggressively promoted their products. Your awareness is 0%, their awareness is 100%. Your product would achieve about half the demand it would have received if it also had 100% awareness.

PLACE (SALES BUDGET)

Place operates in a similar fashion to Promotion. The Sales Budget creates relationships with customers and establishes distribution channels. In the short term, your sales force promotes your products, which increases demand. In the long term, your Sales Budget builds distribution channels.

You allocate a Sales Budget for each product. The sales force increases demand for the product it represents. For example, suppose a customer is considering two identical products. You have a salesperson present, your competitor does not. You will make the sale two out of three times. Similarly, if your competitor's salesperson is present and yours is not, your competitor will make the sale two out of three times.

Each market segment has a distinct sales channel (a Traditional channel, a High End channel, etc.). The strength of your sales channel is measured by its accessibility on a scale of 0 to 100%.

Tip: Think of awareness and accessibility as “before” and “after” the sale. The Promo Budget drives awareness, which persuades the customer to look at your product. The Sales Budget drives accessibility, which governs everything during and after the sale. The Promo Budget is spent on advertising. The Sales Budget is spent on distribution, order entry, sales budgets, customer service, etc.

Accessibility can be compared directly with the Promotion Budget's awareness. If you drop your Sales budget to zero, you lose one third of your accessibility each year. Like awareness, 0% accessibility does not imply zero sales. Instead, sales potential might be half what it could be because it is more difficult for customers to find your product or interact with you.

SALES FORECASTING

Accurate sales forecasting is a key element to team success. Building too many units results in extra time/material costs and inventory carrying costs. Building too few units means stock outs and lost sales which can be even more costly.

Here is a method to help you forecast a product's demand. To make things easier, let's assume that your product is in a single segment, say Performance. If your product is straddling two segments, repeat the process for each segment.

First, develop a gross estimate for the average product's demand in the segment. For example, if demand will be 2500 units and there are five products in the segment, the average product will see demand for 500 units. The gross estimate serves as a reality check. Assuming you and your competitors are doing their best to capture sales, it is unlikely that your product will see more than twice the average demand or less than half.

You will find last year's unit demand and the segment growth rate on the segment's Market Segment Analysis page in the *CAPSTONE® COURIER*. Example: If the Total Industry Unit Demand last year was 1915, and the growth rate 19.8% (.198), then next year we can expect demand of:

$$1915 \times (1 + .198) = 2294 \text{ units}$$

Products might enter or leave the segment. Examine the Perceptual Map (*COURIER* page 11). It shows where products are currently placed, and the Revision Date at the bottom of the page reveals the timing of any future repositionings. Any new products about to come to market must have a plant. They will be exposed on the Production Analysis (*COURIER* page 4).

Will your product be better or worse than average? As a quick estimate, look at the December Customer Survey score at the bottom of the Market Segment Analysis page. The Customer Survey drives demand each month. For example, if there are four products in December scoring (32, 28, 22, and 14) for a total of 96, then the top product's December demand would be about 32/96 or 33%.

What monthly Customer Survey scores will your product have during the year? They will change from month to month because the

TABLE 3-1 Steps to Develop a Product's Sales Forecast

Determine industry demand next round. Take last year's total demand and multiply by (1 + Growth Rate).	See <i>CAPSTONE® COURIER</i> , Market Segment Analysis (pages 5 - 9).
Estimate the number of products that will be in the segment. Divide the total industry demand by the number of products. Your product's demand will typically be between one half and twice the average product's demand.	See <i>CAPSTONE® COURIER</i> , Market Segment Analysis pages, the Perceptual Map (page 11), and the Production Analysis (page 4).
Compare your product with competing products. Factors include design, awareness, accessibility, and planned mid-year revisions.	See <i>CAPSTONE® COURIER</i> , Market Segment Analysis (pages 5 - 9).
Examine industry capacities, and the capacities of the "best" products. Can products meet the demand they generate?	See <i>CAPSTONE® COURIER</i> , Production Analysis (page 4).

Perceptual Map evolves, your product ages, and it might be revised. Each monthly score is driven by "the 4 P's"— Product (design), Promotion (awareness), Place (accessibility), and Price. If the TQM module is on, some initiatives could also increase demand. Often it helps to generalize to "my product will be better (or worse) than average."

Consider whether or not the top products in the segment can meet their demand. On the Production Analysis, examine the top products' capacities. Can they make enough? If not, you could have an opportunity to exploit.

From this, develop a worst/best case estimate for your product's demand. You want to be able to say to teammates, "Our worst case for this product's demand cannot possibly be worse than this because...." Similarly, you need a best case estimate that you can defend.

Enter the worst case on your Marketing spreadsheet in the "Your Sales Forecast" column. Enter your best case on your Production spreadsheet after adjusting for any existing inventory. The spread between the positions will show up in Inventory on your Proforma Balance Sheet (Figure A-12 on page 64). This is your worst case scenario — lots of inventory consuming your cash. However, if you still have cash in the worst case, and if your worst case was truly worst case, you cannot take an Emergency Loan from an unexpected inventory expansion. Your Proforma Income Statement will also reflect the worst case for sales and profits.

To see your best case, return to the Marketing spreadsheet and enter forecasts greater than your inventory. Now the Proformas will show the best case Balance Sheet and Income Statement. The actual results should lie somewhere between the worst and best cases.

Unlike awareness, accessibility applies to the entire segment and not just the product alone. This has three important implications:

1. Customer access to the product depends on the accessibility strength in the segment;
2. The more products you have in a segment, the stronger your distribution channels, support systems, etc. This is because each product's Sales Budget contributes to the strength of the segment's accessibility;
3. If your product exits the segment, it leaves the old segment's accessibility behind. If it enters a different segment, it inherits the accessibility present in the new segment.

Achieving 100% accessibility is difficult. Teams must have two products inside the segment. Each product experiences diminishing returns at a Sales Budget of \$3 million. However, the segment's overall diminishing return is not reached until budgets total \$4.5 million (for example, two products with Sales Budgets of \$2.25M each). Once you do reach 100% accessibility, you can scale back the segment's total Sales Budget to around \$4 million and maintain your accessibility.

PRODUCT

Product is the primary concern of your R&D Department. It controls the three factors that affect design:

- Positioning
- Age
- Reliability (MTBF)

For further information, see "THE ROUGH CUT" on page 8 and "THE FINE CUT" on page 10.

ADVANCED MARKETING

Your instructor can choose to use an optional Advanced Marketing module. When it is enabled the Strategy pull-down menu in Capstone.xls will have an arrow leading to a Marketing submenu. The optional Marketing Module allows teams to allocate their Promotion Budgets among five different media types and their Sales Budgets among three different sales channels. See the website's "Using the Optional Marketing

Module" tutorial for detailed information and documentation.

PRODUCTION

Production of products takes place in individual plants, which you own. You begin with five products, one in each plant. You can build up to three additional factories, for a maximum of eight. We call any product built in a factory a unit.

Tip: Remember to buy capacity and automation (build a plant) for any new product line you create.

CAPACITY

First Shift Capacity is defined as the number of units that can be produced on an assembly line (that is, no Second Shift) in a single year. Assembly lines can produce up to twice their First Shift Capacity by hiring a Second Shift (or, if the Optional Human Resources Module is activated, by requiring the First Shift to work Overtime). For example, an assembly line with a capacity of 2 million units per year could produce 4 million units. However, Second Shift and Overtime wages are 50% higher than the First Shift. Hiring a Second Shift generates Recruitment and Training costs. Changes in capacity and automation also affect Recruitment, Training and Separation costs (see "STAFFING INFORMATION" on page 24).

ADDING CAPACITY

Capacity is purchased by entering a positive value in the Buy/Sell Capacity cells on the Production Spreadsheet. Each new unit of capacity costs \$6 for the floor space plus \$4 times the automation rating. For example, if you wish to add 1 million units of capacity to an assembly line with an automation rating of 5, the cost would be \$26 million (see Table 3-2).

The cost of adding capacity is calculated automatically on the Production Spreadsheet.

TABLE 3-2 Cost to Add 1 Million Units of Capacity to a Factory with an Automation Level of 5

Floor Space (per unit)	\$6.00
Automation (per unit)	\$4.00 times the Automation rating
With an Automation level of 5.0 (per unit)	$\$4.00 \times 5.0 = \20.00
Floor Space and Automation at a rating of 5 (per unit)	$\$6.00 + \$20.00 = \$26.00$
Times 1 million units	\$26,000,000

Tip: There is a one year lag between the purchase of capacity and automation and its availability.

SELLING CAPACITY

Capacity is sold by entering a negative value in the Buy/Sell Capacity row on the Production Spreadsheet.

Existing capacity can be sold at the beginning of the round for \$0.65 on the dollar value of the original investment. You can replace the capacity in later rounds, but you have to pay full price.

If you sell capacity for less than its depreciated value, you lose money (which is reflected as a write-off on your Income Statement). If you sell capacity for more than its depreciated value, you make a gain on the sale. This will be reflected as a negative write-off on the Income Statement (see Figure A-10 on page 63).

Tip: Depreciation is calculated over a straight-line 15-year period.

SELLING CAPACITY TO TERMINATE A PRODUCT

If you sell all of the capacity on a production line, CAPSTONE® interprets this as a liquidation instruction.

In addition to capacity, CAPSTONE® will sell your remaining inventory for half the average cost of production. CAPSTONE® writes off the loss on your Income Statement.

Tip: If you sell all but one unit of Production capacity, your inventory will not be liquidated and it can then be sold for full price.

AUTOMATION

Automation levels are given a scale of 1.0 to 10.0, with 1.0 being the least automated and 10.0 being the most. At the beginning of the simulation, all assembly lines have an automation level between 3.0 and 5.0.

Each assembly line is unique to the product it manufactures. You cannot move an existing product from one assembly line to another because:

- Automation levels vary from one line to the next;
- Special tooling is required when a product is developed.

As automation levels increase, the number of labor hours required to produce each unit falls. At an automation rating of 1.0, labor costs are highest. At a rating of 10.0, labor costs fall about 90%.

Labor costs increase each year because of the Annual Raise in labor's contract. Optional Labor Negotiations and a Human Resources Module can also be scheduled during the simulation. See "HUMAN RESOURCES" on page 24.

Despite its attractiveness, two factors should be considered before raising automation:

1. Automation is expensive: At \$4 per automation level, raising automation from 1.0 to 10.0 costs \$40 per unit of capacity.
2. As you raise automation, it becomes increasingly difficult for R&D to reposition products short distances. At an automation level of 1.0 it is possible to move a product 1.7 units on the Perceptual Map in a single year. At 10.0 it takes 1.1 years to move a product 0.1 units (See "R&D" on page 14). This relationship does not apply to long moves on the map. You can move a product a long distance at any automation level, but the project will take between 2.5 and 3.0 years.

Tip: If you reduce automation, you will incur a retooling cost. The net result is you will be paying money to make your plant *less* efficient. While reduced automation will speed R&D redesigns, by and large it is not wise to reduce an automation level.

CHANGING AUTOMATION

Automation levels are changed by entering values in the New Automation row on the Production Spreadsheet. For each point of change, up *or* down, the company is charged \$4 per unit of capacity. For example, if a line has a capacity of 1,000,000 units, the cost of changing the automation level from 5.0 to 6.0 would be \$4 million. Reducing automation does not have the same effect as selling capacity. You will not receive cash for lowering your automation, but will be billed instead (see the Tip above, Table 3-2, and “WHAT WOULD IT COST TO MAXIMIZE AUTOMATION?” on page 32).

Tip: Plants cannot have an automation level less than 1.0.

CAPITAL BUDGET LIMIT

The system limits your net capacity and automation purchases to an amount of money you could reasonably spend. The Capital Budget Limit equation, shown in Table 3-3, uses last year’s financial statements.

TABLE 3-3 Capital Budget Limit

Capital Budget Limit	=	(Maximum Issue Bonds + Maximum Issue Stock + Working Capital) - 60 Days of Working Capital
Days of Working Capital	=	(Current Assets - Current Liabilities) / (Sales/365)

UNIT COSTS

A product’s unit production cost, or Unit Cost, is broken into two components, material cost and labor cost. Material cost is driven by the product’s positioning (performance and size) and MTBF, which are assigned during R&D. Labor cost is driven by three factors:

1. Wage and Benefit rates;

2. Automation levels: Lines with higher automation levels require fewer workers;
3. Second Shift/Overtime costs: Labor costs for units produced on Second Shift or Overtime are 50% higher.

INVENTORY CARRYING COSTS

Companies are charged an inventory carrying expense of 12% of the average cost of production for unsold units remaining at the end of the year.

See “PRODUCTION SPREADSHEET” on page 47.

FINANCE

Your Finance Department is primarily concerned with five issues:

1. Acquiring the capital needed for company activities. Capital can be acquired through:
 - Current Debt (Short Term Debt)
 - Stock Issues
 - Bond Issues (Long Term Debt)
 - Profits
2. Establishing a Dividend policy that maximizes the return to shareholders.
3. Setting Credit policies for customers and suppliers.
4. Driving the financial structure of the firm, its relationship between debt and equity.
5. Selecting and monitoring performance measures that support your strategy.

CURRENT DEBT (SHORT TERM DEBT)

Your banker offers short term debt in one-year notes. These become due at the beginning of the following year. Your spreadsheet automatically retires all Current Debt. You can “roll” the debt into the next year by simply borrowing the same amount again. You pay no brokerage fees to acquire Current Debt.

However, as a general rule you should fund long term investments in plant and equipment with Bond Issues (see below), and limit Current Debt to short term obligations

(for example, Accounts Payable, inventory expansions or changes in Accounts Receivable policy).

Next year's interest rates are a function of your debt level. The more debt you have relative to your assets, the more risk you present to debt holders. Interest rates are driven by risk. Borrowing this year will force next year's interest rates higher. Bonds lock in the current bond rate at today's lower interest.

BOND ISSUES (LONG TERM DEBT)

Each year you are given a credit rating that ranges from AAA to D. In CAPSTONE®, ratings are evaluated by comparing your short term interest rates with the prime rate.

If your firm has no debt at all, your short term interest rate is the prime rate and you are awarded an AAA bond rating. As your debt-to-assets ratio increases, your short term interest rates increase. Your bond rating slips one category for each additional 0.5% in interest. For example, if the prime rate is 10%, and your short term interest rate is 10.5%, then you would be given an AA bond rating instead of an AAA.

You pay a 1.4% premium over short term interest rates. This is for the privilege of "locking in" your long term debt. For example, if your short term interest rate is 12.1% then your bond rate is 13.5%.

You pay a 5% brokerage fee when you issue bonds and a 1.5% brokerage fee if you retire bonds before they are due. Bonds that are allowed to mature do not incur retirement fees.

Each CAPSTONE® bond has a series number. The first three digits denote the interest rate of the bond. The last four digits indicate the year in which the bond is due. These two numbers are separated by the letter S which stands for "series." For example, a bond with the number 12.6S2007 has an interest rate of 12.6% and is due December 31, 2007.

All bonds are ten-year notes. During that time, you pay a coupon, the annual interest payment, to investors. If the face amount or principal of bond 12.6S2007 were

\$1,000,000, then the holder of the bond would receive a payment of \$126,000 every year for ten years. The holder would also receive the \$1,000,000 principal at the end of the tenth year.

You can buy back outstanding bonds before their due date by entering an amount in the Retire Long Term Debt row on the Finance Spreadsheet. These bonds are repurchased at their market value or street price on January 1 of the current round. The street price is determined by the amount of interest the bond pays and your credit worthiness. It is therefore different from the face amount of the bond. Example: A bond with a face amount \$10 million could cost \$11 million to repurchase early because of fluctuations in interest rates and your credit worthiness.

Tip: Bonds are retired in the order they were issued: The oldest bonds retire first.

If any bonds remain on December 31 of the year they become due, your banker issues short term or Current Debt to pay off the principal. This, in effect, converts your Long Term Debt due on December 31 to Current Debt, which must be covered in the following round.

Tip: Bond (Long Term Debt) repayment is done automatically; you do not need to take special action to retire a bond that is due.

Using bond 12.6S2007 as an example, the \$1 million repayment is acknowledged in your reports and spreadsheets in the following manner: Your reports printed on December 31, 2007, would reflect an increase in Current Debt of \$1 million, offset by a decrease in Long Term Debt of \$1 million. The bond disappears from the list.

In other words, your 2007 spreadsheet would list the bond on your Finance Spreadsheet because you are making decisions on January 1, 2007 (when the bond still exists). Your 2008 spreadsheet would show a \$1 million increase in current debt and the bond no longer appears.

ISSUE AND RETIRE STOCK

You can issue or retire stock. Transactions take place at the current market price. You are charged a 5% brokerage fee to issue stock and 1.5% brokerage fee to retire stock.

DIVIDENDS

Dividends are paid to stockholders in quarterly installments at a rate per share that you establish at the beginning of the year. For example, if you set a dividend policy of \$2.00 per share, the dividend would be paid during the year in four \$0.50 installments.

STOCK PRICE

Stock price is a function of:

- Book Value
- Earnings Per Share (EPS)
- Dividend Policy

Book Value is defined as Equity divided by Shares Outstanding. Equity is Common Stock plus Retained Earnings. Shares Outstanding are the number shares that have been issued. For example, if Equity is \$50 million and there are 2 million shares outstanding, Book Value is \$25 per share.

EPS is calculated by dividing Net Profit by the number of Shares Outstanding.

Dividend is the amount of money paid per share to stockholders. Stockholders ignore dividends beyond the EPS, considering them unsustainable. For example, if your EPS is \$2.50/share, and your dividend \$3.00/share, stockholder's would ignore anything above \$2.50/share as a driver of stock price.

All of these factors are profit dependent. You need to make sufficient profit to increase the Book Value of your company and pay a Dividend. Improving profit also improves EPS.

Tip: Emergency loans cause stock price to fall, even when you are profitable. Stockholders take a dim view of your performance when they witness a liquidity crisis.

CREDIT POLICY

Customer and supplier credit policies are set on the Marketing Spreadsheet. You deter-

mine the number of days between transactions and payments. For example, you could give customers 30 days to pay their bills (Accounts Receivable) while holding up payment to your suppliers for 60 days (Accounts Payable).

Shortening the A/R (Accounts Receivable) Lag from 30 to 15 days in effect extracts a loan from customers. Similarly, extending the A/P (Accounts Payable) Lag from 30 to 45 days extracts a loan from your suppliers.

The Accounts Receivable Lag has implications for demand. If you offer no credit terms, demand falls to about 65% of maximum. At 30 days, demand is 92%. At 60 days, demand is 98.5%. At 120 days, demand is 100%. The longer the lag, the more cash is tied up in receivables.

The Accounts Payable Lag has implications for Production. Suppliers become concerned as the lag grows until they eventually withhold material for production. At 30 days, they withhold 1%. At 60 days, they withhold 8%. At 90 days, they withhold 26%. At 120 days, they withhold 63%. At 150 days, they withhold 100% of your material. This creates shortages on the production line. That causes workers to stand idle, and ultimately causes per-unit labor costs to rise.

EMERGENCY LOANS

Financial transactions are carried on throughout the year directly from your cash account. If you manage your cash position poorly, CAPSTONE® will give you an Emergency Loan to cover the shortfall.

The simulation gives you every benefit of a doubt during the year. However, if you are out of cash on December 31, a gentleman we refer to as "Big Al" arrives at your door with a checkbook and a smile. Big Al gives you a loan exactly equal to the shortfall. You pay one year's worth of short term interest on the loan, and Big Al adds a 7.5% penalty fee on top to make it worth his while. For example, suppose you are short \$10 million on December 31. You pay one year's worth of interest on the \$10 million plus an additional 7.5% or \$750 thousand penalty.

The Emergency Loan is combined with any other Current Debt due at the beginning of the next round. You do not need to do anything special to repay it. You do, of course, need to decide what to do with the Current Debt (pay it off, re-borrow it, etc.) The penalty only applies to the year in which the Emergency Loan is taken, not to future rounds.

See “FINANCE SPREADSHEET” on page 49.

HUMAN RESOURCES

STAFFING INFORMATION

The Human Resources Spreadsheet provides teams with detailed information about their company’s staffing costs and requirements:

- First Shift Complement
- Second Shift Complement
- Overtime (when the Human Resources Module is enabled)
- Turnover Rate
- New Employees
- Separated (laid-off) Employees
- Recruiting Costs
- Separation Costs
- Training Costs

Tip: Recruitment, Training and Separation are “Admin” costs. They appear (per product line) on Page 2 of the Annual Report (see Figure A-10 on page 63).

Teams that schedule production levels that exceed a line’s capacity (therefore adding Second Shift workers) will note an increase in their Recruiting and Training Costs. Teams that decrease their labor requirements through the sale of capacity or by raising automation levels will note an increase in Separation Costs— the costs associated with letting workers go.

Results can also be found in the HR/TQM Report (see Figure A-8 on page 61).

See “HUMAN RESOURCES SPREADSHEET” on page 51.

Your instructor can choose to use an optional Human Resources Module. When it is enabled, you can determine Workforce Complement (the number of workers employed, entered on the Production Spreadsheet), and Recruiting and Training budgets (the Recruiting Spend and Training Hours cells are green). The HR module examines improving workforce productivity. Through sustained effort, you can reduce labor costs as much as 20%. See the website’s “Using the Optional Human Resources Module” tutorial for detailed information and documentation.

LABOR NEGOTIATION

Your instructor can schedule Labor Negotiations during the simulation. Please also see the website’s “Labor Negotiation” tutorial for detailed information and documentation.

A Labor Negotiation begins with workers asking for a 10% across-the-board increase in Wages, Benefits, Profit Sharing and Annual Raise.

Next, Management formulates its bargaining position. There are several options to consider. For example, in order to control costs, management might offer labor less than their demands and force a strike. If this is the case, Management should consider building extra inventory to ride it out.

Or Management might consider meeting labor’s demands, and build extra inventory to take advantage of product shortages when workers strike other companies.

Or Management could exceed labor’s demands. Labor will, of course, accept and then demand the same offer from competitors. This would force a strike at competitors and ultimately raise their labor costs.

Once it has determined its strategy, Management decides its Starting Position (first offer) for Hourly Wage. For Wages, the negotiation Starting Position cannot be less than 80% or more than 150% of the current contract.

TABLE 3-4 Example of a Negotiation Position and Resulting Strike Time. Note that the Annual Raise is 0% to 0%. This is because 110% of 0 is 0.

	Starting Position	Negotiation Ceiling	Demand	Contract	Strike in weeks
Hourly Wage	\$18.00	\$19.80	\$22.00	\$20.90	2.2
Benefits	\$2,500	\$2,750	\$2,750	\$2,625	0.0
Profit Sharing	1.5%	1.7%	2.2%	1.95%	0.5
Annual Raise	0.0%	0.0%	7.2%	3.6%	7.2
Total Length of Strike					9.9

For example, if the current Hourly Wage is \$20.00, your Starting Position offer could be anywhere between \$16.00 (80% of \$20.00) and \$30.00 (150% of \$20.00).

Your Negotiation Ceiling (which represents the maximum Management is willing to pay) is always 10% above the Starting Position. The spreadsheet automatically calculates the Negotiation Ceiling. If the Starting Position offered \$16.00 then the Negotiation Ceiling would be \$17.60 – if the Starting Position offered \$30.00 then the Negotiation Ceiling would be \$33.00.

Management must also determine its Starting Position for Benefits, Profit Sharing and Annual Raise. The Starting Position for these areas must be between 0% and 150% of the current contract. Your Negotiation Ceiling will be 10% above each Starting Position.

For example, if the current Benefits package were \$2,500, your Starting Position must fall between \$0 and \$3750. However, if you choose a Starting Position of 0, your Ceiling will be 0 as well (0 x anything = 0).

Tip: The spreadsheets calculate wage and benefit costs (labor costs) on a per unit basis.

Labor looks at the Starting Positions from every company and constructs a set of demands based on either the best offers received from all the companies, or the 10% across-the-board increase they have already asked for, whichever is higher.

This creates an opportunity for a team to offer labor more than they expect. Labor takes that offer and then demands the same from the other teams. Therefore, teams that have achieved low labor costs could sacrifice some of their savings to force higher labor costs upon their competitors.

If the Starting Position and Negotiation Ceiling bracket labor's Demand, negotiations lead to a settlement. For exam-

ple, labor wants \$22.00. Your Starting Position is \$20.00 and Negotiation Ceiling is \$22.00. Your negotiation range is within Labor's Demand, and you will reach an agreement of \$21.00, halfway between your Starting Position of \$20.00 and Labor's Demand of \$22.00.

However, if your Negotiation Ceiling is \$21.90 and Labor's Demand is \$22.00, labor will strike. At the end of the strike you will settle for \$21.95, halfway between your Negotiation Ceiling of \$21.90 and Labor's Demand of \$22.00. All strike settlements are halfway between your Negotiation Ceiling and Labor's Demand.

Strike length depends on the gaps between the positions.

Workers will strike one week for:

- Every \$1 your Wage Negotiation Ceiling is beneath Labor's Demand;
- Every \$300 your Benefits Negotiation Ceiling is beneath Labor's Demand;
- Every 1% your Profit Sharing Negotiation Ceiling is beneath Labor's Demand;
- Every 1% your Annual Raise Negotiation Ceiling is beneath Labor's Demand.

The maximum length of a strike is 84 days. See the example in Table 3-4.

Strikes always occur at the end of the year. If a strike were 21 days, workers would picket during the last three weeks of December. Strikes stop production but not Sales or R&D. If you have inventory on hand during the strike, sales will continue.

PROCESS MANAGEMENT AND TQM INITIATIVES

Your instructor may schedule rounds during which your company has the option of investing in quality management initiatives. Check with your instructor to see if initiatives have been scheduled. Please also see the website's "TQM Initiatives" tutorial for detailed information and documentation.

There are eight in all— five Process Management initiatives and three Total Quality Management (TQM) initiatives. Budgeting money to quality initiatives will (depending on the investment):

- Produce administrative savings;
- Improve production efficiency (by lowering labor and/or material costs);
- Increase demand;
- Reduce R&D time.

PROCESS MANAGEMENT INITIATIVES

CPI (Continuous Process Improvement)

Systems: Reduces material cost and to a lesser degree labor costs.

Vendor JIT (Just in Time [Inventory]):

Reduces material costs and administrative overhead.

QIT (Quality Initiative Training):

Reduces labor costs.

Channel Support Systems: Increases the effectiveness of the Sales Budget, and therefore demand.

Concurrent Engineering: Reduces R&D cycle time, the time needed to move products on the Perceptual Map and to change MTBF specifications.

TQM INITIATIVES

Benchmarking: Reduces Administrative overhead and Inventory carrying costs.

Quality Function Deployment Effort:

Reduces R&D cycle time and enhances effectiveness of Promo and Sales budget.

CCE (Concurrent Engineering)/6 Sigma Training: Reduces material costs, labor costs,

and increases effectiveness of Promo and Sales budget.

Returns for TQM investments follow the shape of an "S" curve. That is, if you spend too little or too much, returns are modest. The midpoint on any given initiative is \$1 million per year. If you spend less than \$500,000, chances are you will see little return. If you spend more than \$2 million per year, chances are you will push into diminishing returns.

If you spend \$2 million on all eight initiatives you will expense \$16 million this year. Since these initiatives are paid for from operations, they appear on your Income Statement, leading to reduced profits in the current year. Although some immediate benefits follow from this year's expenditures, pay-back typically takes between 18 months and two years. Teams that invest in the same areas over two or three rounds (depending on the amount of money) will experience decreasing and eventually no returns for their investments. Expenditures beyond \$5 million on a particular initiative push into diminishing returns.

For example, suppose you wanted to reduce the time required to complete R&D projects. The most aggressive schedule would be \$2 million this year (staying within diminishing returns), \$2 million next year (which would not produce as much benefit, but would continue to improve R&D cycle time), and \$1 million in the third year (which would reach the maximum possible benefit).

The effects can be seen in the current year on the TQM Spreadsheet. As you make decisions, a worst-case/best-case set of outcomes is predicted. These are also carried into the Proforma Financial Reports.

The spreadsheet can only offer a range of possible savings. Actual results appear in the HR/TQM Report the following round. The report summarizes the expenditures and benefits received by all teams (see Figure A-8 on page 61).

See "PROCESS MANAGEMENT AND TQM INITIATIVE SPREADSHEET" on page 52.

The **Situation Analysis** is a team exercise designed to help your group understand the current market conditions and how the industry will evolve over the next eight years. There are five parts to the analysis:

- Perceptual Map (below)
- Demand Analysis (page 30)
- Capacity Analysis (page 31)
- Margin Analysis (page 33)
- Consumer Report (page 36)

The analysis can be done as a group, or you can assign the parts to individuals and then report your findings to the rest of the team. At the end of this exercise you will understand:

- How technology will reshape customer expectations over the next eight years. This will drive your overall strategic vision;
- How demand will increase, and how that will affect your investments in capacity;
- How much money you can make. That is, determine the profit potential in a best-case scenario;
- How customers perceive you and your competitors today. Is there room for improvement?

PERCEPTUAL MAP

This task examines how technology will shape your industry in the future. In the CAPSTONE® sensor industry, the most basic customer concerns are: How big is the sensor? How well does it perform? Think of the sensors in your car. They measure things like pressure, speed, and temperature. In general, smaller sizes are preferable to bigger sizes and higher performance levels (sensitivity, speed, etc.) are better than lower performance levels.

Figure 4-1 on page 28 shows the Perceptual Map from the Round 0 (Starting Conditions) CAPSTONE® COURIER.

Imagine the Perceptual Map as a pan of water. If you dropped a pebble in the upper-left corner, you would see a wave advance across the map towards the lower-right. Three customer

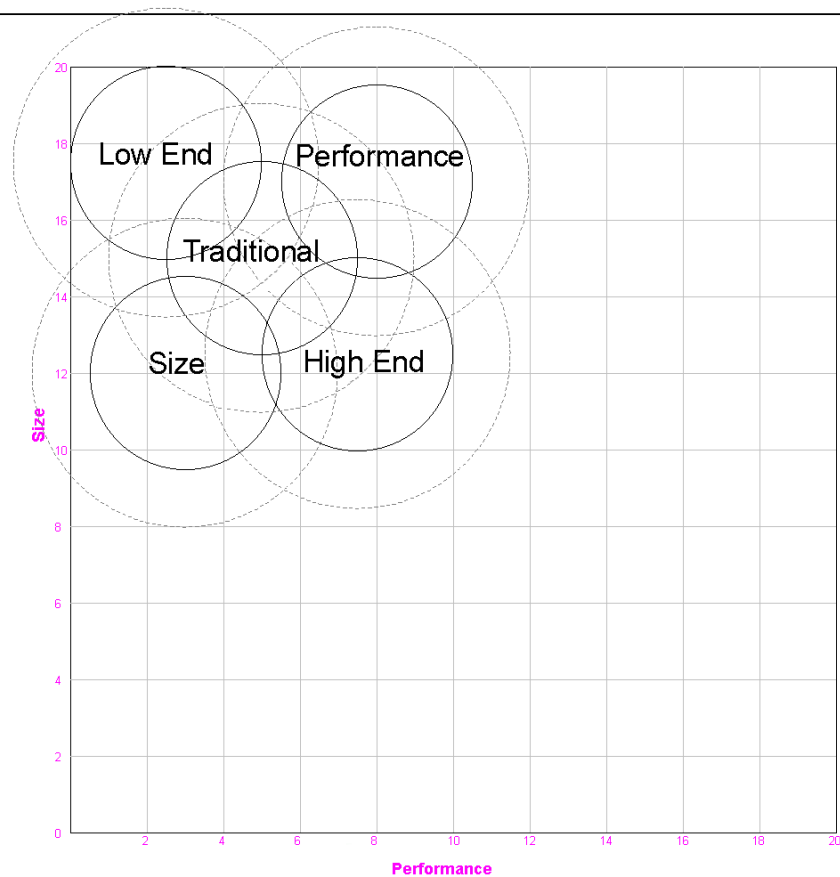


FIGURE 4-1 Perceptual Maps allow teams to assess the merits of competing products relative to customer needs.

groups ride this wave of technology, Performance, High End and Size. Behind the wave are the two low technology segments, Traditional and Low End.

The dark inner circles have a radius of 2.5 units. They represent the heart of the segments.

The dashed outer circles have a radius of 4.0 units. They represent the absolute outer fringe of the segment. There are no customers beyond the dashed circles.

The map axes are numbered from 0 to 20. These numbers are used to plot product and segment locations.

Inside each segment there is also an Ideal Spot where customers are most concentrated.

You want to know:

- Where the segments will be in each future round. That is, how fast are the segments moving and in what direction?
- Where the highest customer concentration or Ideal Spot is located within each segment.

PLOT THE SEGMENT LOCATIONS FOR EACH ROUND

Table 4-1 on page 29 lists the segment center points at the conclusion of each round. Plot this information on Figure 4-1 (or page 11 of the Capstone® *COURIER*). Some students plot only the segment center points. Others prefer to draw a circle with a radius of 2.5 units around each segment center.

TABLE 4-1 Segment center positions at the conclusion of each round

		Round								
Segment	Coordinates	0	1	2	3	4	5	6	7	8
Traditional	Performance	5.0	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.6
	Size	15.0	14.3	13.6	12.9	12.2	11.5	10.8	10.1	9.4
Low End	Performance	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5
	Size	17.5	17.0	16.5	16.0	15.5	15.0	14.5	14.0	13.5
High End	Performance	7.5	8.4	9.3	10.2	11.1	12.0	12.9	13.8	14.7
	Size	12.5	11.6	10.7	9.8	8.9	8.0	7.1	6.2	5.3
Performance	Performance	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
	Size	17.0	16.3	15.6	14.9	14.2	13.5	12.8	12.1	11.4
Size	Performance	3.0	3.7	4.4	5.1	5.8	6.5	7.2	7.9	8.6
	Size	12.0	11.0	10.0	9.0	8.0	7.0	6.0	5.0	4.0

FIND THE IDEAL SPOT LOCATIONS FOR EACH SEGMENT

An Ideal Spot is the area of highest buyer concentration within a segment. Table 4-2 identifies the Ideal Spot locations relative to the segment centers. The segment Ideal Spot is always in the same position relative to the

center of the segment. That is, as a segment drifts, the Ideal Spot drifts with it.

Use Form 4-1 to determine each segment's Ideal Spot for the next eight years. For example, using Table 4-1, find the High End segment centers for each round. Next, add 1.4 to performance and subtract 1.4 from size. Enter the results in the High End performance and size rows.

TABLE 4-2 Ideal Spot locations relative to segment centers

Segment	Performance	Size
Traditional	0.0	0.0
Low End	-0.8	0.8
High End	1.4	-1.4
Performance	1.4	-1.0
Size	1.0	-1.4

POINTS TO CONSIDER FOR YOUR STRATEGY

Here are a few points to draw from the Perceptual Map:

1. If you never move your products (by repositioning them in R&D), segments will drift past them. A product could easily wind up outside of all segment circles

Form 4-1

		Round								
Segment	Coordinates	0	1	2	3	4	5	6	7	8
Traditional	Performance									
	Size									
Low End	Performance									
	Size									
High End	Performance									
	Size									
Performance	Performance									
	Size									
Size	Performance									
	Size									

Form 4-2

Segment	Round 0	Growth Rate	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
Traditional		9.2%								
Low End		11.7%								
High End		16.2%								
Pfmm		19.8%								
Size		18.3%								

where there are no customers. On the other hand, if you never repositioned a product that began in the High End, it would eventually become a Traditional product and then a Low End product. Customer segments move with or without you, and they advance a little every month.

2. Since you must reposition your products anyway, you could concentrate them in segments that interest you. You do not have to be in every segment.
3. In the high technology segments (High End, Performance and Size), proximity to the Ideal Spot is important. In the low technology segments (Traditional and Low End), proximity is not very important. In all segments, being inside the Fine Cut circle is extremely important, and being inside the Rough Cut circle is critically important.

DEMAND ANALYSIS

This task examines industry growth. Is the industry growing or shrinking? Are the segments growing at the same rate?

An accurate estimate of future demand is critical to your strategy. Fortunately, the publishers of the *CAPSTONE® COURIER* have developed precise estimates of current demand and segment growth rates.

For this exercise you need the Segment Analysis pages (pages 5 - 9) of the *CAPSTONE® COURIER*. To analyze the demand for each segment, find base demand at the

start of the game (Round 0), then calculate demand for Rounds 1 through 8 of the game.

1. At the top of each Segment Analysis page you will find a box called Statistics. Copy the Total Industry Unit Demand number into the Round 0 column of Form 4-2.
2. Given the growth rates in Form 4-2, calculate demand for Rounds 1 through 8. Market segments grow at a constant yearly rate. The growth rates are also found in the Statistics box on the Segment Analysis pages.

POINTS TO CONSIDER FOR YOUR STRATEGY

Here are two points to consider for your strategy:

1. Overall, the market is growing at about 14% per year. Last year your company did roughly \$100 million in sales. By implication in Round 1 the average company will do about, \$114 million, in Round 2, about \$130 million, etc. The average company should double in size in six years.
2. It is easy to confuse unit market size with dollar market size. Although unit volume is higher in the low technology segments (Traditional and Low End), customers are price sensitive and prices are likely to fall over time. High technology customers (High End, Performance, and Size) are less price sensitive, and although prices will decay somewhat, they are more likely to stay high. See Figure 2-9 on page 13 for further information.

Form 4-3

Segment	Product Name	First Shift Capacity(000)		Second Shift Capacity(000)		Automation Level	Cost to Double Capacity	Cost to Raise Automation to 10.0
		Firm	Industry	Firm	Industry			
Traditional		1,800		3,600		4.0	\$39.6M	\$43.2M
Low End								
High End								
Pfmm								
Size								

CAPACITY ANALYSIS

This task examines industry capacity. Does the industry have adequate capacity to serve the market? Are some segments under capacity or over capacity? If we double the size of our company, how much will we need to invest in plant and equipment?

For this exercise you need the Production Analysis (page 4) of the *CAPSTONE® COURIER*.

We need three pieces of information from the Production Analysis.

Product Names: Copy the name of your company's product for each segment into Form 4-3.

Capacity: Copy the value for "Capacity Next Round" into the column under "First Shift Capacity, Firm."

Automation Level: Copy the value for "Automation Next Round" into the "Automation Level" column.

We need to find the Industry Capacity so that we can compare it with the unit demand. Multiply your "First Shift Capacity" by the number of teams and place the result in the "First Shift Capacity, Industry" column.

You can produce up to twice the rated capacity by running a Second Shift. Double your "First Shift Capacity, Firm" and place the result in the "Second Shift Capacity, Firm" column. Double the "First Shift Capacity, Industry" and place the result in the "Second Shift Capacity, Industry" column.

Tip: Second Shift incurs a time-and-a-half labor charge as well as Recruiting and Training costs. This could significantly affect the margins for your products.

From the Demand Analysis we know that the market will double in size within six years. We can address this issue in two ways: We can double our capacity or we can increase our automation levels and make ourselves less sensitive to Second Shift wages.

WHAT WOULD IT COST TO DOUBLE OUR CAPACITY?

Recall from "ADDING CAPACITY" on page 19 that adding one additional unit of capacity costs:

$$\$6 + (\$4 \times \text{Automation Level})$$

Think of it this way. It costs you \$6 per unit to prepare the floor space. On the floor you place an assembly line with automation level of 1.0 to 10.0. Each point of automation costs \$4. For example, the floor space for an assembly line that makes 1,000 units per year costs \$6,000. If it is a simple line with an automation level of 1.0, it costs another \$4,000 to buy the line (total \$10,000).

With an automation level of 10.0, the line costs \$40,000 (total \$46,000 with floor space). The simple assembly line takes many workers to operate. The expensive line takes few workers.

We can summarize this with the formula:

$$\text{Capacity} \times [\$6 + (\$4 \times \text{Automation})] = \text{Investment}$$

Tip: This investment is automatically calculated by the Production screen (See “PRODUCTION SPREADSHEET” on page 47).

Currently the Traditional product has 1.8 million units of capacity (this is shown in thousands, as 1,800) and an automation of 4.0. If we buy an additional 1.8 million units of capacity, we will invest:

$$1,800,000 \times [\$6 + (\$4 \times 4.0)] = \$39,600,000$$

This investment is already entered in Form 4-3. Calculate the investments for the remaining products and place the results in the “Cost to Double Capacity” column.

Tip: Changes in capacity affect labor, recruitment, training and separation costs. See “STAFFING INFORMATION” on page 24.

WHAT WOULD IT COST TO MAXIMIZE AUTOMATION?

What if we took a different approach? We could hire a Second Shift, but then we must pay our Second Shift workers rates of 150% of the normal wage.

If we maximize automation by bringing each line to 10.0, we would have fewer workers and would become indifferent to running a Second Shift.

To get the Traditional product to an automation of 10.0, we need to increase automation 6.0 points. We do not need additional floor space because we are upgrading our existing machines. Our formula produces the following investment:

$$1,800,000 \times [\$0 + (\$4 \times 6.0)] = \$43,200,000$$

This investment is already entered in Form 4-3. Using this formula, substitute the capacity and automation levels for the remaining lines. Enter the results in the “Cost to Raise Automation to 10.0” column.

We must also consider the impact automation has when products are repositioned on the Perceptual Map.

In general, we can classify repositioning into two types of projects, short moves and long moves. Short moves are used to keep up with the segment drift rates. Segments move at speeds between 0.7 units per year and 1.3 units per year. If we want to keep up with the segment, we need to move a short distance each round. Short moves also keep the product's age down. Short moves depend upon a flexible workforce that can make incremental improvements instead of big leaps, and that implies relatively low automation levels. The higher the automation level, the longer it takes to do a short move.

Tip: As a rule of thumb, you can automate to 5.0 or 6.0 in any segment and keep up with the drift rate with short moves every round.

Long moves are used to reposition products to different segments, or to move from the trailing edge of a segment to the leading edge. The move takes place in one big leap. During the R&D project, the product sits at its original location getting older. Long moves are comparable to retooling, and they are indifferent to automation levels. A big move (say 4 units on the map) can be accomplished in 2.5 to 3 years.

Tip: Changes in automation affect labor, recruitment, training and separation costs. See “STAFFING INFORMATION” on page 24.

POINTS TO CONSIDER FOR YOUR STRATEGY

Here are five points to consider for your strategy:

1. The average company will invest between \$100 and \$200 million in plant and equipment during the next eight years to keep up with market growth and improve efficiencies.
2. Capacity in a segment can vary greatly from one round to the next. Old products can exit a segment. New products and repositioned products can enter. As they

Form 4-4

Segment	Product Name	Price	Material Cost	Labor Cost	Second Shift (Y/N)	Contribution Margin	
						\$	%
Traditional					N		
Low End					Y		
High End					N		
Performance					N		
Size					N		
Margin Potential							
Traditional		\$30.00	\$8.00	\$3.36	N	\$18.64	62%
Low End					N		
High End					N		
Performance					N		
Size					N		

enter and exit, their production capacity moves with them.

- Segments that are short of capacity are quite different than segments with too much capacity. Capacity shortages often lead to product shortages and a Seller's Market. Capacity excesses lead to over-production and a Buyer's Market.
- These two states do not gradually shift from one to the other. They are more like ice and water. A little under capacity and you can price high and sell everything. A little over capacity and the power shifts to the customer. Then you must compete on the merits of your product (see "PRICE" on page 9).
- Check Plant Utilization every round (Production Analysis, page 4 of the *CAPSTONE® COURIER*). Plant utilization of 100% means that you are running one complete first shift. At two full shifts, utilization is 200%. If a plant is utilizing below 100%, consider liquidating capacity. Conversely, if a plant is close to 200% utilization, consider adding capacity to meet demand.

Fast moving, high tech segments tend to favor additional capacity over increased automation because they can make short moves more easily. Slow moving low tech segments favor automation over capacity because customers are willing to tolerate higher ages and poorer positioning.

MARGIN ANALYSIS

This task examines profit potential. How much money could we make? Do all segments offer the same opportunity? What drives our margins?

For this exercise you need the Production Analysis (page 4) of the *CAPSTONE® COURIER* and the five Segment Analysis pages (5 through 9).

We need four pieces of information from the Production Analysis:

- Product Name
- Price
- Material Cost
- Labor Cost

Copy this information to the top section of Form 4-4. We will use it to explore our current situation.

Calculate the current Contribution Margin Per Unit for each product. Contribution Margin is simply price minus material cost minus labor cost. As an example, if a product's price were \$20, its material \$8 and its labor \$7, the Contribution Margin Per Unit would be:

$$\$20 - \$8 - \$7 = \$5$$

Next, calculate the current Contribution Margin Percentage for each product. This is simply Contribution Margin Per Unit divided by the Price. Continuing with the

example above, if the Contribution Margin Per Unit were \$5 and the Price \$20, then the Contribution Margin Percentage would be:

$$\$5 / \$20 = 25\%$$

MARGIN POTENTIAL

In the bottom of Form 4-4 we will explore the upper limits of profitability. The highest Contribution Margin would be the highest price less the lowest possible material and labor costs.

We will need the upper price limits for each segment. These are found on the Segment Analysis pages in the boxes called Customer Buying Criteria.

Enter the upper price limit for each product in the bottom part of Form 4-4 (\$30.00 for the Traditional segment is already entered).

RELIABILITY AND POSITIONING COMPONENT COSTS

Material costs are driven by two components:

- The MTBF specification (the Reliability Component Cost); and
- The positioning on the Perceptual Map (the Positioning Component Cost).

Higher reliability, higher performance and smaller size, result in higher material costs. It

TABLE 4-3 Material Positioning Component Costs for Fine Cut Circle (Approximate)

	Trailing Edge	Leading Edge
Traditional	\$3.80	\$7.80
Low End	\$1.00	\$5.00
High End	\$6.00	\$10.00
Performance	\$4.50	\$8.50
Size	\$4.50	\$8.50

TABLE 4-4 Minimum Material costs for the Traditional segment

Trailing Edge Positioning Component Cost	\$3.80
Minimum Reliability Component Cost	$\$0.30/1,000 \times 14,000 = \4.20
Total	\$8.00

follows that the lowest possible material costs are produced by lower reliability, bigger size, and poorer performance.

MTBF drives material costs at the rate of \$0.30 per 1,000 hours of reliability.

The Reliability Component Cost of a product with a 17,000 hour MTBF rating is:

$$\$0.30 / 1,000 \times 17,000 = \$5.10$$

Each segment expects a minimum MTBF found in the Customer Buying Criteria box on the Market Segment Analysis pages. For example, the minimum acceptable reliability in the Traditional segment is 14,000 hours, which produces a Reliability Component Cost of:

$$\$0.30 / 1,000 \times 14,000 = \$4.20$$

To understand the Positioning Component Cost, recall the analogy used to describe the Perceptual Map earlier in this chapter. If the map were a pan of water, and you drop a pebble in the upper-left corner, a wave front of technology would roll across the map towards the lower-right corner. Material costs are highest at the wave front, and fall steadily with distance behind the wave. They are highest at the leading edge of the High End segment, and lowest at the trailing edge of the Low End segment.

Similarly, Positioning Component Costs are higher at the leading edge of a segment than at the trailing edge. The Fine Cut Circle costs are listed in Table 4-3.

Last year, at the leading edge of the Traditional segment, Positioning Component Costs were approximately \$7.80. At the trailing edge of the Traditional segment Positioning Component Costs were approximately \$3.80.

ADDING THE COMPONENT COSTS

In the Margin Potential portion of Form 4-4, estimate the minimum combined material cost. To do this, add the trailing edge Material Component Cost in Table 4-3 to the minimum Reliability Component Cost for each segment (see the example in Table 4-4).

LABOR COSTS

To illustrate labor costs, we will assume last year that the base labor cost was \$11.20 per unit (this is not the actual labor cost).

The base labor cost is defined as the cost to produce a unit using First Shift labor on a production line with the lowest possible automation. In CAPSTONE®, all production lines must have an automation rating of at least 1.0.

Tip: Remember, unit costs increase when a Second Shift is deployed, and as Wage and Benefit escalators take effect.

To estimate the lowest possible labor costs, we must assume a high automation level, no Second Shift, and a favorable labor contract.

Using \$11.20 as the base labor cost per unit (when automation is at 1.0), labor costs fall \$1.12 (10%) for every point increase of automation. When 9.0 points are added to the automation level (bringing it to 10.0), labor costs fall to \$1.12 per unit.

In the Margin Potential section of Form 4-4, enter an estimate for per unit labor costs using the following assumptions:

- Base labor cost of \$11.20 per unit
- No Second Shift
- No annual wage increase
- Automation levels as follows:
 - Traditional 8.0
 - Low End 10.0
 - High End 5.0
 - Performance 6.0
 - Size 6.0

Use the formula below to calculate per unit labor costs for each segment:

$$[\$11.20 - (\text{Automation} \times \$1.12)] + \$1.12 = \text{Unit Cost}$$

For example, labor costs for Traditional products made on a line with an automation level of 8.0 are:

$$[\$11.20 - (8.0 \times \$1.12)] + \$1.12 = \$3.36$$

Tip: In the high technology segments (High End, Performance and Size) the automation levels should be lower than the low technology segments (Low End and Traditional) because R&D projects become increasingly difficult with higher automation.

“BEST CASE” MARGIN POTENTIAL

We now have all the information we need to determine a “Best Case” margin potential and complete the Contribution Margin columns in the Margin Potential section of Form 4-4.

For example, in the Traditional market, the top price in the segment is \$30. The minimum Cost of Goods Sold is:

$$\$8.00 + \$3.36 = \$11.36$$

Therefore, the highest Contribution Margin is:

$$\$30 - \$11.36 = \$18.64$$

The Contribution Margin Percentage is:

$$\$18.64 / \$30 = 62\%$$

How realistic is this Contribution Margin? Not very, yet margins above 50% do occur regularly within CAPSTONE®. Much depends on the competitive environment. It is important to know, however, where the upper limits lie.

POINTS TO CONSIDER FOR YOUR STRATEGY

It is unlikely that you could do much better than the Contribution Margins in Form 4-4, but not impossible. For example, suppose that you have the only product in the High End segment. In this happy monopolistic environment, you could automate to 10.0, drop MTBF to the bottom of the range, and raise your price \$4.99 above the posted price range (see page 9). Of course, the opportunity was created when your competitors exited the segment.

It follows that you must keep an eye on competitors to “keep them honest.”

Form 4-5

Traditional		Low End		High End		Performance		Size	
Price		Price		Price		Price		Price	
Reliability		Reliability		Reliability		Reliability		Reliability	
Age		Age		Age		Age		Age	
Positioning		Positioning		Positioning		Positioning		Positioning	
Awareness		Awareness		Awareness		Awareness		Awareness	
Accessibility		Accessibility		Accessibility		Accessibility		Accessibility	
Overall		Overall		Overall		Overall		Overall	

CONSUMER REPORT

This task examines what our product offers to customers. Is there room for improvement? If our competitors increase the rivalry, how can we respond?

For this exercise you need the Production Analysis (page 4) of the *CAPSTONE® COURIER* and the five Segment Analysis pages (5 through 9).

The Customer Buying Criteria box on each Segment Analysis page lists what customers want and how important each product characteristic is to them. In Form 4-5, evaluate each of the products in relation to these criteria. Rate each product as follows:

- G = Good
- F = Fair
- P = Poor

Price: Award a Good if your product's price is in the bottom third of the expected price range, Fair if it is in the middle third and Poor if it is in the top third.

Reliability: Award a Good if the MTBF specification is in the top third of the range, Fair if it is in the middle third and Poor if it is in the bottom third.

Age: Award a Good if the age on December 31 is within 0.5 years of the ideal age, Fair if the age is 0.6 to 1 year and Poor if the age is beyond 1 year.

Positioning: Award a Good if your product is within 0.5 units of the segment's Ideal Spot, Fair if it is 0.6 to 1.5 units away and Poor if it is beyond 1.5 units.

Awareness: Award a Good if your product's awareness exceeds 80%, Fair if it is 50% to 80% and Poor if it is below 50%.

Accessibility: Award a Good if your product's accessibility exceeds 80%, Fair if it is 50% to 80% and Poor if it is below 50%.

Your Overall assessment should consider the relative importance of the Buying Criteria listed on the Segment Analysis pages (also found in Figure 2-9 on page 13). For example, in the Traditional segment, age is the most important criteria, accounting for 47% of the purchase decision. Reliability is least important criteria, accounting for only 9% of the purchase decision. In the Overall row, give your products a Good only if the top two attributes rate Good, and if the awareness and accessibility ratings are at least Fair.

When you finish, compare your results with the December Customer Surveys on the Segment Analysis pages. The scale is 0 to 100. If 0, it means that customers refused to purchase the product in December, although they did buy it sometime earlier in the year (perhaps it was repositioned). A score below 25 can be considered Poor, 26 to 50 Fair, and above 50 Good.

A solid product line is fundamental to all Differentiation Strategies, which offer superior products to generate high demand, then increase price to trade off some of that demand for higher margins.

POINTS TO CONSIDER FOR YOUR STRATEGY

Here are five points to consider:

1. Strive to give your customers the top two Buying Criteria. Sacrifice what

- customers do not care about to give them what they want.
2. There is a tendency to focus on the Perceptual Map. Keep in mind that the Perceptual Map is more important as a Rough Cut consideration than a Fine Cut distinction.
 3. It takes time and maintenance to build a solid product offering. Try to get the maximum benefit from R&D. Invest routinely in awareness and accessibility.
 4. If all competing products are equal, they split the market equally, regardless of their merits. To achieve substantially higher demand than a competing product, you must have a substantially better offer.
 5. It does not matter how good your product is if you stock out. A good product must be backed by adequate production capacity to supply the demand it generates.

NEXT STEPS

A Situation Analysis is only the first step in developing a good business plan. It tells you what is possible and what is not. Team organization and forming a strategic vision for your company are important next steps. The organization tips below should help your team get started. The basic strategies listed on page 39 are by no means the only strategies you can follow, but they are all viable and can serve as building blocks during your team's conversations. They can help you establish a common vision and mission for your company.

ORGANIZING YOUR TEAM

Whether your group meets in cyberspace or face-to-face, your company's success depends on:

- The work you as an individual put into the company;
 - The caliber of the decisions you reach.
- Research studies with CAPSTONE® indicate successful groups discuss the issues, explore alternatives and then reach a consensus.

Winning teams get the facts and do analysis before making decisions. They work on a decision until everybody agrees, not until the holdouts give in. Members voice their doubts. Every team member contributes to the limits of their ability and knowledge, and endeavors to expand these limits.

Teams that do not win usually demonstrate one or more of the following characteristics:

- They are dominated by one individual;
- They compromise between two competing business strategies;
- They engage in *group think*, where members privately sacrifice doubts for the good of team spirit;
- One or more team members are quietly shunned for reasons ranging from limited abilities to limited knowledge.

As a rule, it takes 1½ to 3 hours for a team to determine decisions for the next round. It is important to organize your team before formulating strategies and making decisions.

Tip: Be sure to review CHAPTER 5 “WEBSITE & SPREADSHEET OPERATION” starting on page 40 and the website’s animated demonstrations for information on decision entry.

ROLE ASSIGNMENTS

The tables on page 38 provide team organization examples. Remember that each team member can have more than one role.

See the “Team Organization” tutorial on the website for an in-depth discussion of role assignments.

PRODUCT MANAGER

Each team starts with five products, one for each market segment (listed in Table 4-5). Assign everyone a product to manage (keep in mind that as the game progresses new products can be added and old ones eliminated). On teams with fewer than five members, at least one person will have two products. On teams larger than five members, some products will have two managers or team members will create products to manage. Circle your product(s) in Table 4-5.

TABLE 4-5

Team	Andrews	Baldwin	Chester	Digby	Erie	Ferris
Traditional	Able	Baker	Cake	Daze	Eat	Fast
Low End	Acre	Bead	Cedar	Dell	Ebb	Feat
High End	Adam	Bid	Cid	Dixie	Echo	Fist
Performance	Aft	Bold	Coat	Dot	Edge	Foam
Size	Agape	Buddy	Cure	Dune	Egg	Fume

SEGMENT MANAGERS

Segment Managers track competing products within a segment. Make sure everyone has a segment to follow. Do not assign the segment to the person who manages your product in that segment (for example, the Able product manager should not monitor the Traditional segment). Segment manager agendas and product manager agendas often conflict. You want two sets of eyes on the issues. Assign everyone at least one segment to monitor. Circle your segment(s) in Table 4-6.

TABLE 4-6

Traditional	Low End	High End	Size	Performance
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FUNCTIONAL MANAGERS

Functional Managers assume responsibility for an entire department. Large teams will assign two people to some departments. Circle your department(s) in Table 4-7.

TABLE 4-7

R&D	Marketing	Production	Finance	Human Resources
-----	-----------	------------	---------	-----------------

COMPETITIVE INTELLIGENCE OFFICER

Competitive Intelligence Officers monitor competitors in their entirety. That is, they monitor the competitors' production, marketing and financial positions and try to predict their future strategy. There are up to six teams in CAPSTONE® (your class might have fewer). Assign everyone at least one competitor to monitor. Circle the name(s) of the competitor(s) you are to monitor in Table 4-8.

TABLE 4-8

Andrews	Baldwin	Chester	Digby	Erie	Ferris
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SIX BASIC STRATEGIES

The six basic strategies below can serve as starting points for your strategy. They are by no means the only strategies you can follow, but they are all viable and can serve as building blocks during your team's strategic conversations.

COST LEADER WITH PRODUCT LIFE CYCLE FOCUS

The Cost Leader with Product Life Cycle Focus seeks to minimize costs through efficiency and expertise, allowing products to age and change in appeal from one segment's to another segment's buyers. A company using this strategy would have low R&D spending, investments in automation early in a products life cycle, and spend moderately on promotion and sales. It would focus on ROE, ROS, and Profits.

DIFFERENTIATION STRATEGY WITH PRODUCT LIFE CYCLE FOCUS

Differentiation Strategy with a Product Life Cycle Focus seeks to be known as a top producer of good performing products in all segments. A company using this strategy would have multiple product lines in all segments with high promotion and sales investments to create maximum awareness and accessibility. R&D expenditures would be high to continually reposition and freshen product lines with little investment in increased automation or production capacity. It would focus on ROA, Stock Price, and Asset Turnover.

BROAD COST LEADER

A Broad Cost Leader attempts to be the low-cost producer in all segments of the market while maintaining good profit margins on all sales and keeping prices low for price-sensitive customers. A company using this strategy would be more likely to reposition products than introduce new ones to the market, and would spend less on promotion and

sales budgets. Capacity improvements are unlikely to be undertaken while automation may be pursued to increase margins. Investments would be financed with debt and/or stock issues. It would focus on Market Share, Profits, and Stock Price.

BROAD DIFFERENTIATION

The Broad Differentiation strategy seeks to be well known as a maker of high quality/highly desirable products by creating maximum awareness and brand equity. A company using this strategy would have high R&D spending to keep products fresh and to maintain a presence in all market segments. Prices would be higher, and it would spend heavily on promotion and sales to create maximum awareness and accessibility. It would focus on Market Share, Profits, and Stock Price.

NICHE COST LEADER

A Niche Cost Leader seeks to dominate the price sensitive Low End and Traditional segments by setting prices below all competitors while still being profitable. A company using this strategy would have multiple product lines in the Low End and Traditional segments with high automation. Marketing budgets would be modest and focused toward cost sensitive customers. Investments would be financed with debt and/or stock issues. It would focus on ROS, ROE, and Profits.

NICHE DIFFERENTIATION

A Niche Differentiation company seeks to be known far and wide as the top producer of the best performing state-of-the-art products. A company using this strategy would have multiple product lines in the High End, Performance and/or Size segments with a minimum focus in Low End and Traditional. Its promotion and sales budgets would be high to create maximum awareness and accessibility. Likewise, R&D expenditures would be high to continually introduce new product lines and keep existing products fresh. This company would not make many investments in increased automation or production capacity. It would focus on ROA and Asset Turnover.

WEBSITE & SPREADSHEET OPERATION

THE WEBSITE

Go to www.capsim.com. Enter your User ID and password (if you forget your User ID or password, use the “Need your User ID and password emailed to you? Click Here!” link).

Tip: If you have not joined a team, the site will ask if you want to join or create one. You can skip this page if you do not know your team, but you will not be able to do any team-specific activities until you join one.

WELCOME PAGE

Your browser now displays your Welcome page. Please verify that you are in the correct Simulation ID and team.

Tip: If your Simulation ID and/or team are incorrect, click the Support Center link and use the form to request the corrections.

Please review the Scheduled Tasks, which includes a checklist of what you need to get started. You will also find links to animated spreadsheet demonstrations. The Welcome page also includes summations of team activity and selected financial statistics.

YOUR ACCOUNT

The Account link opens a page where you can update or correct your email address and change your password.

DECISIONS

Clicking the Making Decisions link (Figure 5-1) opens the Capstone.xls download area. Please follow the instructions on this page. Capstone.xls is a Microsoft® Excel spreadsheet that you will use to enter your team’s decisions. The download will take a few sec-



FIGURE 5-1

onds for broadband users, less than three minutes for dial-up. Capstone.xls requires an Internet connection.

Clicking Decision Audit displays your team’s Official Decisions and an audit trail of all the decisions you and your teammates have made through the course of the simulation.

Tip: Your team can change and update Official Decisions as often as needed. In fact, as your team formulates each round’s decisions, you will most likely update them several times. Once the round is processed, Official Decisions for that round become final.

USING CAPSTONE.XLS

Locate Capstone.xls. Double-click the file to open it (alternatively, from Microsoft Excel, click the File menu, go to Open and locate Capstone.xls).

As the spreadsheet opens, you might be asked to Enable Macros. Macros are needed for spreadsheet functions, so please click

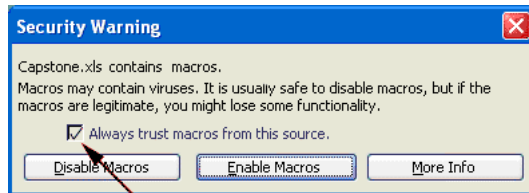


FIGURE 5-2 If the Enable button is gray, click the Always Trust checkbox, then click Enable.

Enable (Figure 5-2). If the Enable button is unavailable, please click the “Always trust...” checkbox.

As Capstone.xls continues to open, a login box appears (Figure 5-3).

Enter your User ID and password, then click OK. A new dialogue box appears. If you wish to start working with your team, select “The latest decisions taken directly from the website.” If you wish to start learning on your own, independent of your team, select “The rehearsal simulation.”



FIGURE 5-3

SAVING DECISIONS

When you save your decisions, the spreadsheet asks if you want to upload them directly to the website or to a file on your local computer (Figure 5-4). Decisions saved to the website become part of your team’s Official Decision file.

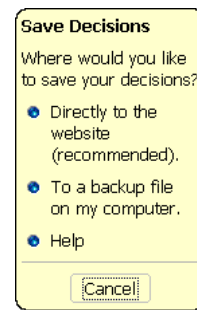


FIGURE 5-4

Decisions sent to the website can be saved by Product, Functional Area, or All Products and Areas (Figure 5-5). What decisions you send depends on how your team is

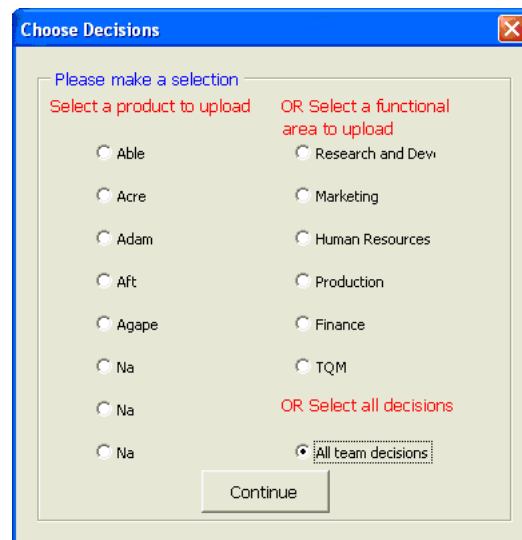


FIGURE 5-5

organized. Make certain the option is correct before clicking the Continue button.

Decision Management

As corporate executives, all team members have the authority to create and upload decisions. Communication and coordination between team members is crucial. Otherwise, problems might arise.

For example, if one teammate makes decisions for a specific product, other teammates could conceivably overwrite those decisions if they upload by Functional Area or All Team Decisions.

The website's Decision Audit lists all decision changes. Our system also sends emails to all team members each time the Official Decisions change.

MENUS

The menu bar displays eight options: Capstone Menu, File, View, Undo, Strategy, Proformas, Last Year's Reports and Help.

A tool palette on the right side of the display (Figure 5-6) provides shortcuts to many spreadsheet features. Passing the cursor over the individual icons opens a label for the icon.



FIGURE 5-6

CAPSTONE MENU

The Capstone Menu launches the Coach, an interactive assistant who will help you learn how to use the spreadsheets. Please use the Coach, you will find him very informative.

FILE

- Save Decisions– You can save decisions directly to the website (recommended), or to a file on your local machine.
- View Decisions– This selection opens the website's Decision File Audit Trail, which tracks decision uploads for the entire team.
- Exit Capstone– Please use this selection (or the exit icon on the tool palette) when exiting Capstone.xls.

VIEW

- Full Screen
- Normal– Allows the Excel window to be resized and minimized.

UNDO

- Undo to last save
- Undo to start of round– Erases all decisions for the round.

STRATEGY

Spreadsheets are selected from the Strategy Menu or from the tool palette. To open a spreadsheet, select R&D, Marketing, Production, Finance, Human Resources, or TQM Initiative.

Green and yellow are the colors used in the cell displays: Values in green cells can be changed. The yellow display cells cannot be changed by users. Numbers with decimal points are in units of 1. Numbers without decimals are in 1000's.

To use a spreadsheet, move the cursor to any green cell and type in a value. When you press Enter, the computer recalculates all the formulas and displays the results.

Tip: Some green cells will turn red if an entry becomes too large.

Each spreadsheet works independently. However, most spreadsheets depend on values entered on other spreadsheets. For example, the Production Spreadsheet relies on the Forecast and Accounts Payable information on the Marketing Spreadsheet.

PROFORMAS

The Proforma Finance statements are estimates (should all projections be accurate) of what the financial statements will look like at the end of the year. The Proformas include a Balance Sheet, Income Statement, Cash Flow Statement, and a selection of useful financial ratios.

Tip: The Proforma predictions can vary widely from year-end results. For example, sales estimates or product prices might be unrealistically high, making the Proforma numbers look great. However, if sales fall short of estimates, the round results will be significantly different from the Proforma numbers.

See “PROFORMAS” on page 64.

LAST YEAR’S REPORTS

This menu displays and prints the *CAPSTONE® COURIER*, a sensor-industry newsletter available to all teams, and your Annual Report, which is only available to your team. See “CAPSTONE® COURIER” on page 55 and “ANNUAL REPORTS” on page 62.

Tip: While the *Courier* and your Annual Report are also available from the website’s Reports section, the pages will paginate properly if you print them from the Last Year’s Reports menu.

HELP

The Help menu links to frequently asked questions, the online version of the *Team Member Guide*, and selected tutorials.

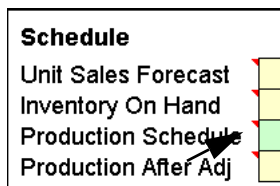


FIGURE 5-7
Pass your cursor over the spreadsheet flags (which display as red) to open explanation boxes.

SPREADSHEET FLAGS

Red Flags on the spreadsheets activate pop-up explanation windows (Figure 5-7). Passing the cursor over any flag will

provide information about the associated row or column.

R&D SPREADSHEET

Use the R&D Spreadsheet (Figure 5-8) to communicate with your R&D engineers:

- The table in the upper left represents your current product line;
- Each row displays a different product;
- You start with five products. You can add or discontinue products, to a maximum of eight or a minimum of one;

Tip: When you name a new product, make sure the first letter matches the first letter of your company name.

- The green columns in Figure 5-8 allow you to change a product’s performance, size and reliability (MTBF);
- The yellow columns and graphs display the impact of your decisions— think of these as your engineers giving you feedback on your R&D decisions.

There are three types of R&D projects:

1. Repositioning, which changes a product’s performance or size or both, therefore moving the product from its current location on the Perceptual Map to a new one. MTBF ratings can be (but do not have to be) changed when a product is repositioned;
2. Reliability adjustment, which changes a product’s MTBF without changing its position;
3. Invention, which creates a new product.

Tip: Use the Customer Buying Criteria boxes on the Market Segment Analyses (pages 5-9 of the *CAPSTONE® COURIER*) to help determine the best position and reliability level for your products.

When a repositioning project completes, the product’s age is cut in half. Thus, R&D drives three of the four buying criteria – posi-

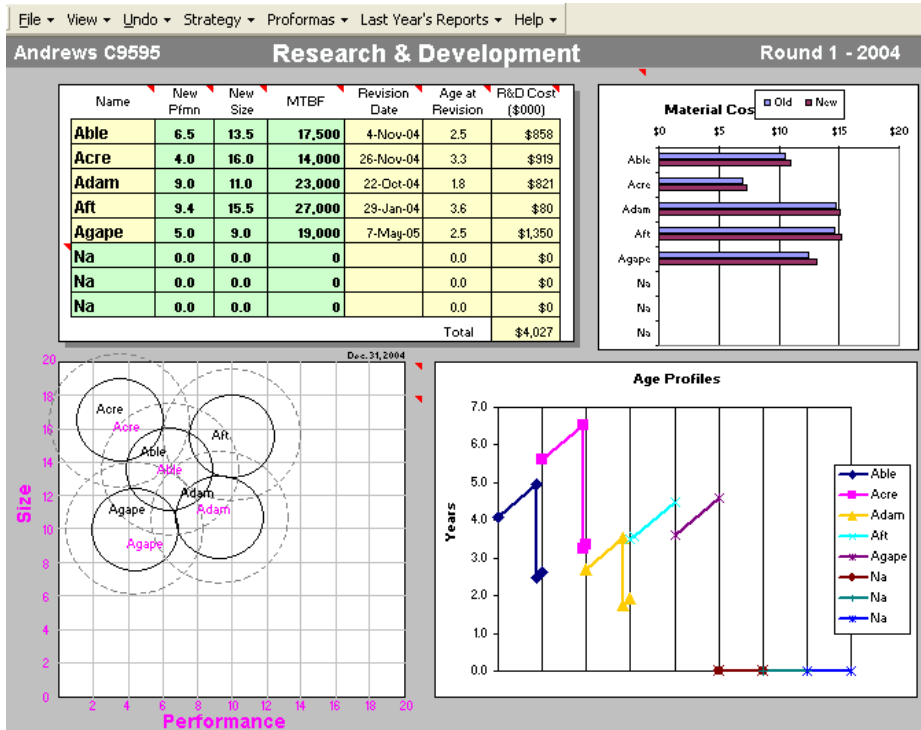


FIGURE 5-8 The Perceptual Map on the R&D screen shows the segment locations at the end of the round (in this case, the locations as of December 31, 2004). Tip: To view the segment locations at the beginning of the round, go to “Last Year’s Reports” and select the Perceptual Map. That map is for yesterday, December 31 of the prior year. The two Perceptual Maps are one year apart in time.

tioning, reliability, and age – leaving only price, which is entered on the Marketing Spreadsheet.

When a team starts a repositioning project, the product name appears twice on the Perceptual Map (once in its current position, written in black, and once in its new position, written in magenta). The computer also develops an Age Profile for the current year and projects material costs.

Tip: When existing products undergo R&D projects, they continue to produce and sell at their old coordinates until the Revision Date. Any inventory on hand at that time is reworked to match the new coordinates.

PRODUCT INVENTION

Teams also create new products with the R&D Spreadsheet. New products are assigned a name (entered in any cell that reads NA– the first letter of all new products should match the first letter of the company name), size

coordinate, performance coordinate, and an MTBF specification.

It takes at least one year to create a new product. The farther the new product is placed from an existing product, the longer it takes to develop. You must also go to the Production Spreadsheet to purchase capacity and set an automation level one year prior to your product’s release. See “CAPACITY AND AUTOMATION” on page 48.

R&D SPREADSHEET DEFINITIONS

Name: Each product’s name begins with the first letter of the team name.

New Performance: Sets each product’s performance level.

New Size: Sets each product’s size.

Tip: Never enter 0 into the R&D Spreadsheet. A value of 0 would move the product to a 0 coordinate on the Perceptual Map.

MTBF (Mean Time Between Failure): Adjusts the MTBF, which determines reliability (the number of hours the product is expected to run before it fails).

Revision Date: The date the project will complete. The revision date varies depending on the number of projects under way and the distance the product is moved from its old coordinates.

Tip: If the Revision Date for a product is more than one year away, the new coordinates will not appear in the next *CAPSTONE® Courier*.

Age at Revision: The age (or Perceived Age) of a product when the project completes. Age is important because some segments want new products while others want older, proven products. For example, suppose a team introduces a product in January of 2006. A year later (2007) they start a repositioning project with a revision date of August 3, 2008, when the product will be 2.6 years old. When the revised product emerges, the market perceives the age of the redesigned product to be half the former age of 2.6 years (that is, the public *perceives* the age to be 1.3 years, hence Perceived Age).

R&D Cost: R&D projects bill at a rate of \$1 million dollars a year. If the dollar amount is less than \$1 million, then the project takes less than a year. For projects that cost more than \$1 million (therefore taking longer than a year), \$1 million will be billed to the current year and the balance to the following year.

Tip: Projects begin on January 1. If a product is still in R&D on January 1 of the following year, you cannot begin a new revision project for that product. The spreadsheet locks the line so that you can make no further changes. Therefore, teams should usually plan all R&D projects to complete in less than one year. See “R&D REVISION TIMES” on page 15.

Material Cost: Material costs are driven by the MTBF rating and by the placement on the Perceptual Map. Higher performance and MTBF values, and smaller size values

increase material costs. See “RELIABILITY AND POSITIONING COMPONENT COSTS” on page 34.

See “R&D” on page 14.

MARKETING SPREADSHEET

Use the Marketing Spreadsheet (Figure 5-9) to work with your marketing managers.

- For every product (rows in the spreadsheet), enter a Price, Promotional Budget, Sales Budget, and Sales Forecast;
- Accounts Receivable (A/R) and Accounts Payable (A/P) lag days allow you to change your credit policy;
- As you make decisions, the marketing team provides feedback in the yellow columns;
- Although the marketing team provides a Unit Sales Forecast, this is a rough estimate. You are the executive manager, so you must determine the true forecast and enter it in the Your Sales Forecast cell (see “SALES FORECASTING” on page 18);
- Set product prices within the range found in the Market Segment Analyses of the *CAPSTONE® COURIER*, (remember, price ranges drop \$0.50 per year, so the ranges for the upcoming year will be \$0.50 less than those published *COURIER*).

When decisions are entered, the spreadsheet computes Gross Revenues, Cost of Goods, and Contribution Margin.

Tip: Marketing decisions for a new product cannot be made until the product is available for sale.

MARKETING SPREADSHEET DEFINITIONS

Name: Product name.

Price: Unit price.

Promo Budget: Amount spent to advertise and promote the product. Promotion Budgets drive awareness.

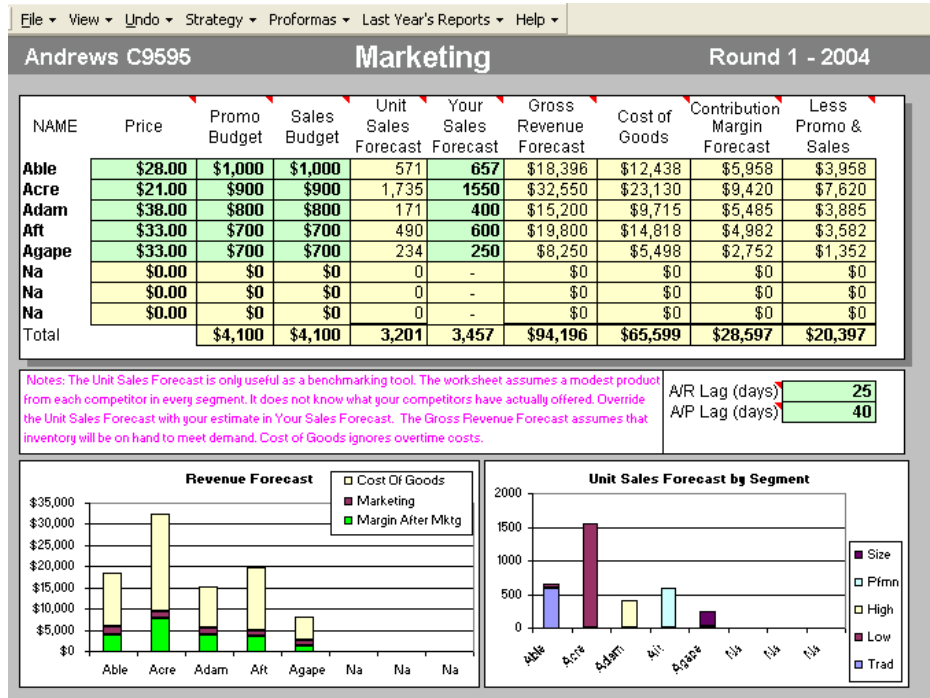


FIGURE 5-9

Sales Budget: Amount spent on distribution systems and sales force. Sales Budgets drive accessibility.

Unit Sales Forecast: Only useful as a benchmark, this forecast is produced to allow you to see the impact Price, Promo Budgets and Sales Budgets have on demand. It assumes you are competing against a set of mediocre products, and does not have any information about actual competitors.

Your Sales Forecast: Overrides the spreadsheet's Unit Sales Forecast. If no value is entered, the spreadsheet will use the Unit Sales Forecast for all calculations. If a value is entered, the computer will use that number.

You should always enter a prediction for unit sales that you have developed on your own. The computer's forecast is only useful as a benchmark. See "SALES FORECASTING" on page 18 for insights on developing Your Sales Forecast.

Gross Revenue Forecast: Unit Sales Forecast times Price. The calculation assumes that enough units will be built to meet demand.

Cost of Goods: The sum of material and labor costs. The Marketing screen may not be aware of Second Shift labor costs, since those

are determined on the Production screen. It assumes that the current labor cost per unit figure on the Production screen is correct.

Contribution Margin Forecast: Gross Revenue Forecast less cost of goods.

Less Promo & Sales: Contribution Margin Forecast less associated promotion and sales budgets.

A/R Lag: The Accounts Receivable Lag (in days) is the time between customers receiving products and when they are expected to pay for them. If companies offer no credit terms, demand falls to about 65% of normal. At 30 days, demand is 92%. At 60 days, demand is 98.5%. At 120 days, demand is 100%. The longer the lag, the more your cash is tied up in receivables.

A/P Lag: The Accounts Payable Lag (in days) is the time between companies receiving material and when they are expected to pay for it. Increasing the lag improves your cash position since you are in effect getting a loan from your creditors. Creditors get upset as the lag increases and withhold material for production. At 30 days, they withhold 1%. At 60 days they withhold 8%. At 90 days they withhold 26%. At 120

days, they withhold 63%. At 150 days, they withhold all of your material.

See “MARKETING” on page 16.

Your instructor can choose to use an optional Marketing Module. When it is enabled the Strategy pull-down menu in Capstone.xls will have an arrow leading to a Marketing submenu. The optional Marketing Module allows teams to allocate their Promotion Budgets among five different media types and their Sales Budgets among three different sales channels. See the website’s “Using the Optional Marketing Module” tutorial for detailed information and documentation.

Schedule, Plant Capacity, and Plant Automation;

- As you input decisions, the production managers provide feedback in the yellow cells and graphs.

Assembly lines have an automation level and a production capacity. The automation rating indicates the amount of labor required for production assembly. Lower ratings require more manpower. Higher ratings require less manpower. First Shift Capacity is defined as the number of units the line can produce with a single shift in a one-year period. Teams can produce up to twice that amount by using a Second Shift.

Tip: Decisions made on the Production Spreadsheet affect Human Resources costs. See “STAFFING INFORMATION” on page 51.

PRODUCTION SPREADSHEET

Use the Production Spreadsheet (Figure 5-10) as you work with your production managers to schedule manufacturing. Schedules should reflect forecasts, inventory levels, and the capacity of each product.

- For each product line (columns on the spreadsheet), you will decide Production

PRODUCTION SPREADSHEET DEFINITIONS

Unit Sales Forecast: The number entered under Your Sales Forecast on the Marketing Spreadsheet. If a number has not been entered, the Production Spreadsheet will use the Unit Sales Forecast.

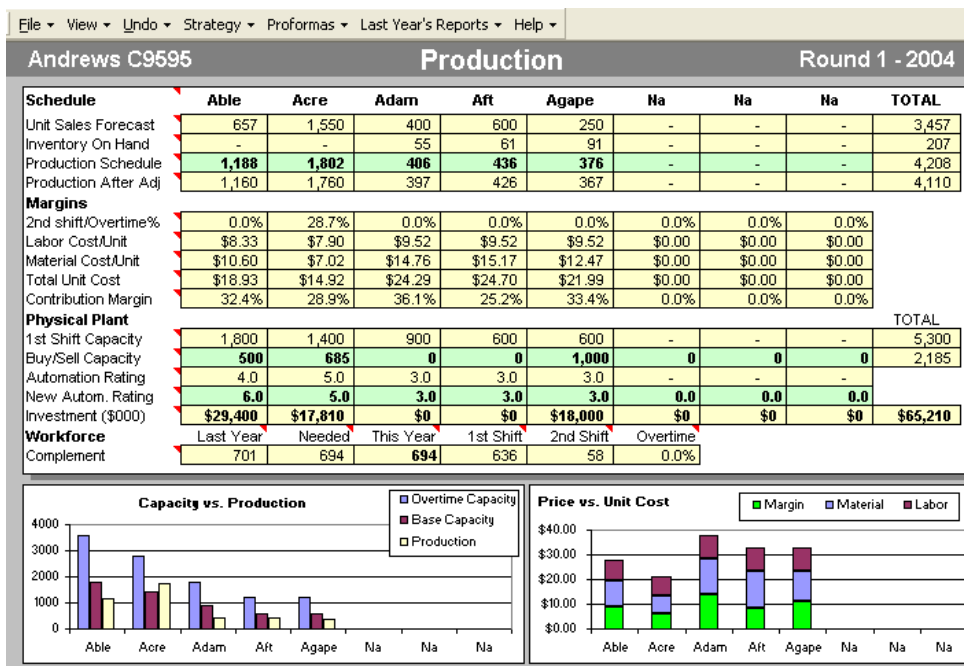


FIGURE 5-10

Inventory On Hand: Unsold inventory from last year.

Production Schedule: Number of units scheduled for production. The maximum possibility: two times the current capacity.

Production after Adj: Accounts Payable (The A/P Lag entered on the Marketing Spreadsheet) and other conditions affect the availability of parts needed to build a product. This line adjusts production forecasts to account for Material shortfalls.

2ND Shift/Overtime %: The percentage of scheduled production run that will be produced on Second Shift or Overtime.

Tip: Overtime only applies when the optional Human Resources Module is activated.

Labor Cost per Unit: The labor cost in dollars to produce each unit (including Second Shift/Overtime wages and benefits).

Material Cost per Unit: Material cost for each unit.

Total Unit Cost: Material cost plus labor cost.

Contribution Margin: Gross profit made on each unit (unit cost divided by price). Unit cost is the sum of labor and Material cost.

CAPACITY AND AUTOMATION

1ST Shift Capacity: Rated capacity of the production line running a single shift.

Buy/Sell Capacity: The number of units of capacity to buy or sell, in thousands of units. There is a one-year lag before new capacity becomes available. That is, it is not available for this year's production, but will be available next year. Capacity purchase price depends on the current automation level. Capacity must be purchased for new products. If it is not the products cannot be built.

Capacity can be sold by entering a negative number to indicate the amount you wish to eliminate. Capacity is sold on January

1 for 65% of the purchase price. Selling off all capacity will terminate a product. See "SELLING CAPACITY TO TERMINATE A PRODUCT" on page 20.

Tip: When capacity is sold, the sale completes immediately and the money is available in the current round.

New Automation Rating: The automation level wanted for the following round. This is the total level, not incremental. For example, to raise a level from 5.0 to 6.0, enter 6.0. There is a one-year lag before the new automation becomes available. A rating of 1.0 equals little automation and significant labor costs. A rating of 10.0 equals heavy automation with few workers. For every point of change (up *or* down) teams are charged \$4 per unit of capacity; changing an assembly line with 1 million units of capacity from an automation of 5.0 to an automation of 6.0 would cost \$4 million. An automation level of at least 1.0 must be assigned to new production lines.

Investment: The cost in thousands of dollars to add new capacity and/or change automation levels.

Capital Budget Limit: The amount of money your company can invest in new capacity and automation.

WORKFORCE COMPLEMENT

The Worker Complement row conveys information about the number of workers needed to run the production lines. These numbers change as Production Schedule numbers are entered, and when new capacity and/or automation levels come online.

When Production Schedules exceed capacity, a Second Shift is hired, which generates Recruitment and Training costs. Similarly, as added capacity comes online, employees are either transferred from the Second Shift or new employees are hired — again, generating Recruitment and Training costs.

If capacity is sold, or if automation levels increase, workers are let go and Separation costs are incurred.

The Worker Complement row has six column headings relating to workforce requirements:

- **Last Year**
 - **Needed**
 - **This Year**
 - **1ST Shift**
 - **2ND Shift**
 - **Overtime** (always zero unless the Human Resources Module is enabled)
- See "PRODUCTION" on page 19.

- The year end Cash Position should be positive (that is, the number should be black). If the year end Cash Position is red, you need to issue Stock, Bonds, or Current Debt (or some combination of the three) to cover expenditures.

As you make decisions, you update your predicted Cash Position. The pie chart will also update, providing you with your company's debt to equity breakdown.

PLANT IMPROVEMENTS

Total Investments and Sales of Plant and Equipment: Improvements and sales ordered on the Production Spreadsheet.

COMMON STOCK

Shares Outstanding: Number of shares of outstanding common stock.

Price Per Share: The price of a share of common stock at the end of last round.

Earnings Per Share (EPS): Last year's net profits, divided by Outstanding Shares. EPS should serve as a reference for determining dividend amounts.

FINANCE SPREADSHEET

Use the Finance Spreadsheet (Figure 5-11) to coordinate fiscal policy with the Controller of your company.

- Teams need to first enter all decision data on the other spreadsheets before they can get an accurate projection of financial demands.

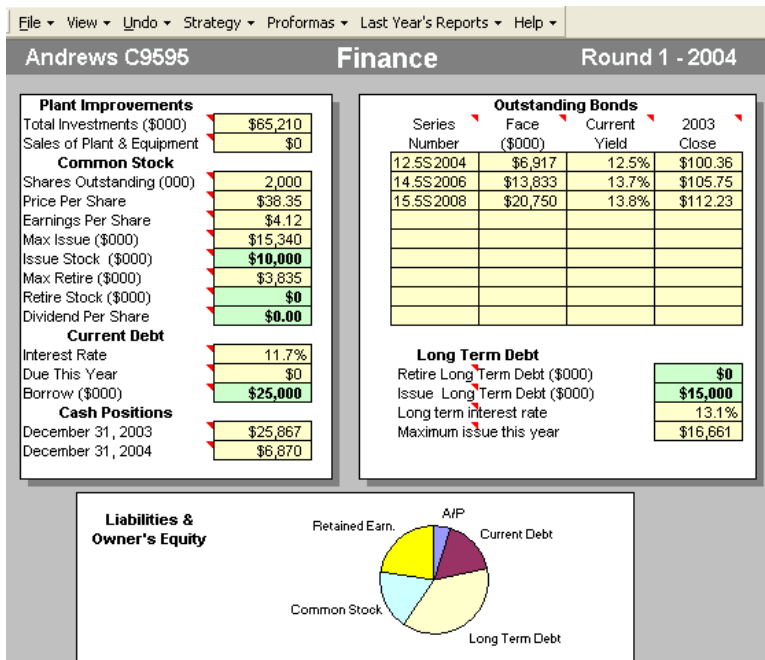


FIGURE 5-11

Maximum Issue: Upper limit in thousands of dollars that teams can issue in stock this year.

Issue Stock: Amount in thousands of dollars that teams wish to issue in stock. A 5% brokerage commission will be subtracted from this year's income. Maximum issue is 20% of total outstanding stock. Stock is issued at its spot price as of December 31 of the year just ended. Brokers charge a 5% fee to issue stock.

Max Retire: Upper limit of stock that can be bought back, in thousands of dollars.

Retire Stock: Amount of stock to retire. Brokers charge a 1.5% fee to buy back stock.

Dividend per Share: The total amount this year teams plan to pay out for each share of stock. Dividends are paid in quarterly installments.

CURRENT DEBT

Interest Rate: The interest currently paid on short term bank debt. Your interest rate is a function of the prime rate and your firm's debt/asset ratio. With a low debt/asset ratio, rates are near prime. With a debt/asset of 0.8 (meaning 80% of your assets are funded by debt), rates are prime plus 5%.

Due This Year: Debt that is due or will be renewed on January 1.

Borrow: Amount of Current (short term) Debt teams choose to borrow in the upcoming year. If you wish to keep last year's level of Current Debt, enter the amount that appears in the Due This Year cell.

CASH POSITIONS

The Cash Position with last year's date is the same as the beginning Cash Position for the current round.

The Cash Position as of Dec. 31 of the current round shows the projected position at the end of this round. It is taken from the Proforma Balance Sheet for the current round (see Figure A-12 on page 64).

A red number in the Cash Position cell indicates a shortfall is expected, and your team will need to turn to the capital markets.

Failing to cover shortfalls will result in an Emergency Loan with an above-market interest rate.

OUTSTANDING BONDS

Series Number: Label given to a bond when it was issued. The first numbers are the interest rate. "S" means series, and the last four digits refer to the year the bond is due. 15.4S2006 means that the bond pays a coupon 15.4% each year and that the principal is due in 2006.

Face (\$000): Principal of the issue. If the face is \$11,040, then \$11.04 million in bonds were issued. Using the 15.4S2006 example, coupons of 15.4% or a total of \$1,700,160 will be paid each year until the bond becomes due in 2006. In 2006, the last coupon and the principal are due. The principal is converted automatically to Current (short term) Debt on December 31 of the year it is due.

Current Yield: A measure of what the bond is worth at current interest rates. To calculate, the stated interest rate is divided by the closing bond price. For example, if the stated interest is 15.4% and the closing price is \$115.80 then \$15.40 divided by \$115.80 gives a yield of 13.3%.

Closing Value: Closing price of the bond last year. Bonds are bought and sold in the marketplace, but since their interest payment is fixed, the price of the bond fluctuates. An S&P risk assessment is made for each firm, ranging from "AAA" (best) to "D" (worst). For each lower grade, investors expect an additional 0.5% yield. The spreadsheet adjusts the closing price of the bond so that the yield reflects current interest rates and an appropriate risk.

LONG TERM DEBT

Retire Long Term Debt: Face amount of the bonds you wish to retire. Oldest bonds are retired first. Bonds are bought back at their street price. Brokers charge a 1.5% fee to retire bonds before they mature (see "BOND ISSUES (LONG TERM DEBT)" on page 22).

Issue Long Term Debt: Face amount of the bond your team wishes to issue. Bonds are due in 10 years. Banks refuse to give credit

when debt/assets exceeds 0.8. Brokers charge a 5% fee to issue bonds.

Long Term Interest Rate: Interest rate teams pay on new bonds. The interest rate is a function of S&P rating and the current prime rate.

Maximum Issue This Year: Upper limit on the amount of long term bonds that can be issued this year.

See "FINANCE" on page 21.

spreadsheet automatically calculates Negotiation Ceilings.

For Wages, the negotiation Starting Position cannot be less than 80% or more than 150% of the current contract.

For Benefits, Profit Sharing and Annual Raise, the Starting Position must be between 0% and 150% of the current contract.

Tip: When the Starting Position is 0, the Negotiation Ceiling will be 0 as well (0 x anything = 0).

HUMAN RESOURCES SPREADSHEET

Your instructor can schedule Labor Negotiations and an optional Human Resources Module during the simulation.

Use the HR screen (Figure 5-12) to establish policies with your HR Managers.

- Your policies should reflect your business strategy. For example, if you wish to R&D frequently, and do not want highly automated production lines, your negotiators can control labor costs by proposing lower wages and benefits.

When negotiations are scheduled, the spreadsheet requires Starting Positions (the minimum offer that Management would like to pay) for each category.

Negotiation Ceilings (which represent the maximum Management is willing to pay) are always 10% above the Starting Positions. The

Please also see the website's "Labor Negotiation" tutorial for detailed information and documentation.

STAFFING INFORMATION

The Human Resources Spreadsheet displays detailed information about staffing costs, including:

- 1ST Shift Complement
- 2ND Shift Complement
- Overtime (when the Human Resources Module is enabled)
- Turnover Rate
- New Employees
- Separated (laid-off) Employees
- Recruiting Costs
- Separation Costs
- Training Costs

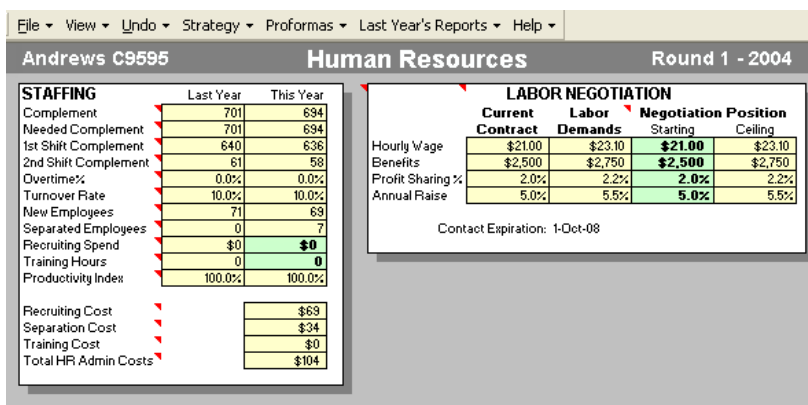


FIGURE 5-12 When the optional Human Resources Module is enabled, the Recruiting Spend and Training Hours cells in the left-hand column are green and will accept entries; Workforce Complement is entered on the Production Spreadsheet. When Labor Negotiation rounds are scheduled, the Starting Negotiation Position column is green. The Ceiling will automatically calculate to be 10% above the Starting Position entry.

Decisions made on the Production Spreadsheet affect Staffing information because:

- Increasing Workforce Complement increases Recruitment and Training costs.
- Reducing Workforce Complement increases Separation costs.

See “HUMAN RESOURCES” on page 24 and HR/TQM Report, (Figure A-8 on page 61).

Your instructor can choose to use an optional Human Resources Module. When it is enabled, you can determine Workforce Complement (the number of workers employed, entered on the Production Spreadsheet), and Recruiting and Training budgets (the Recruiting Spend and Training Hours cells are green). See the website’s “Using the Optional Human Resources Module” tutorial for detailed information and documentation.

PROCESS MANAGEMENT AND TQM INITIATIVE SPREADSHEET

Your instructor can schedule rounds during which your company has the option of investing in quality management initiatives. Check with your instructor to see if initiatives have been scheduled. Please also see the website’s “TQM Initiatives” tutorial for detailed information and documentation.

Use the TQM spreadsheet (Figure 5-13) to communicate with your efficiency experts.

- Invest in the areas that best benefit your strategy and business plan. For example, a Niche Differentiation company would consider Concurrent Engineering to reduce R&D time.

Initiatives improve operation and quality procedures, which (depending on the investment) will:

- Produce administrative savings;
- Improve production efficiency by lowering labor and/or material costs;
- Increase demand;
- Reduce R&D times.

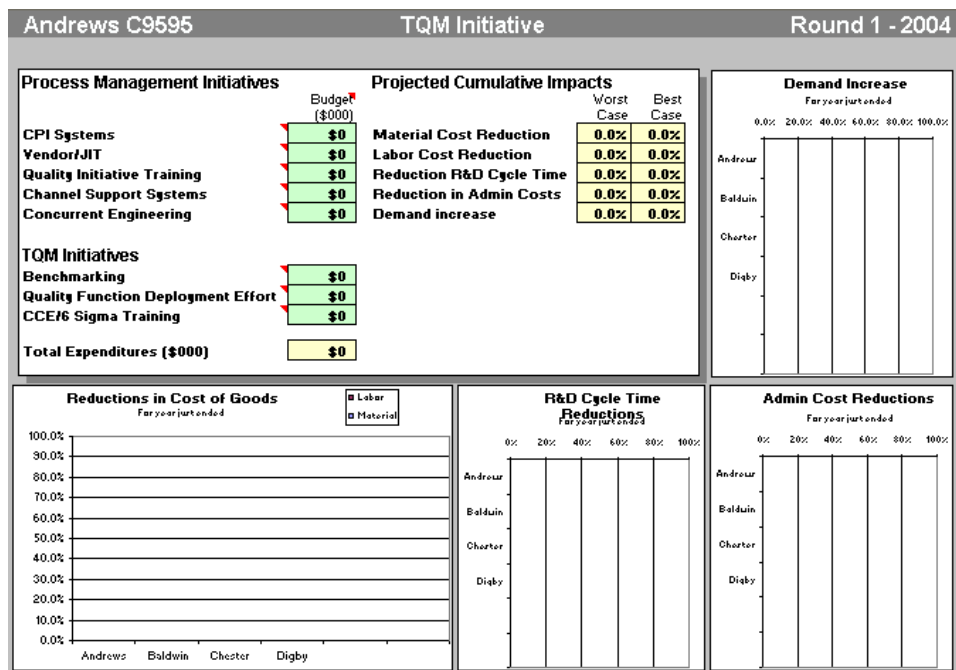


FIGURE 5-13

Any investment will produce savings. Teams need to determine the break-even point of their investments and decide if the expenditures are cost-effective.

Teams can invest in eight areas:

CPI (Continuous Process Improvements) Systems reduces material and labor costs.

Vendor/JIT (Just in Time [Inventory]) Reduces material costs and administrative overhead.

QIT (Quality Initiative Training) reduces labor costs.

Channel Support Systems (Sales Force support) increases demand.

Concurrent Engineering reduces R&D time.

Benchmarking reduces Administrative costs.

Quality Function Deployment Effort reduces R&D time and increases demand.

CCE (Concurrent Engineering)/6 Sigma Training reduces material and labor costs.

These expenditures are totaled in the left-hand column.

Tip: 6 Sigma Training is a process that uses statistical analysis to reduce manufacturing defects.

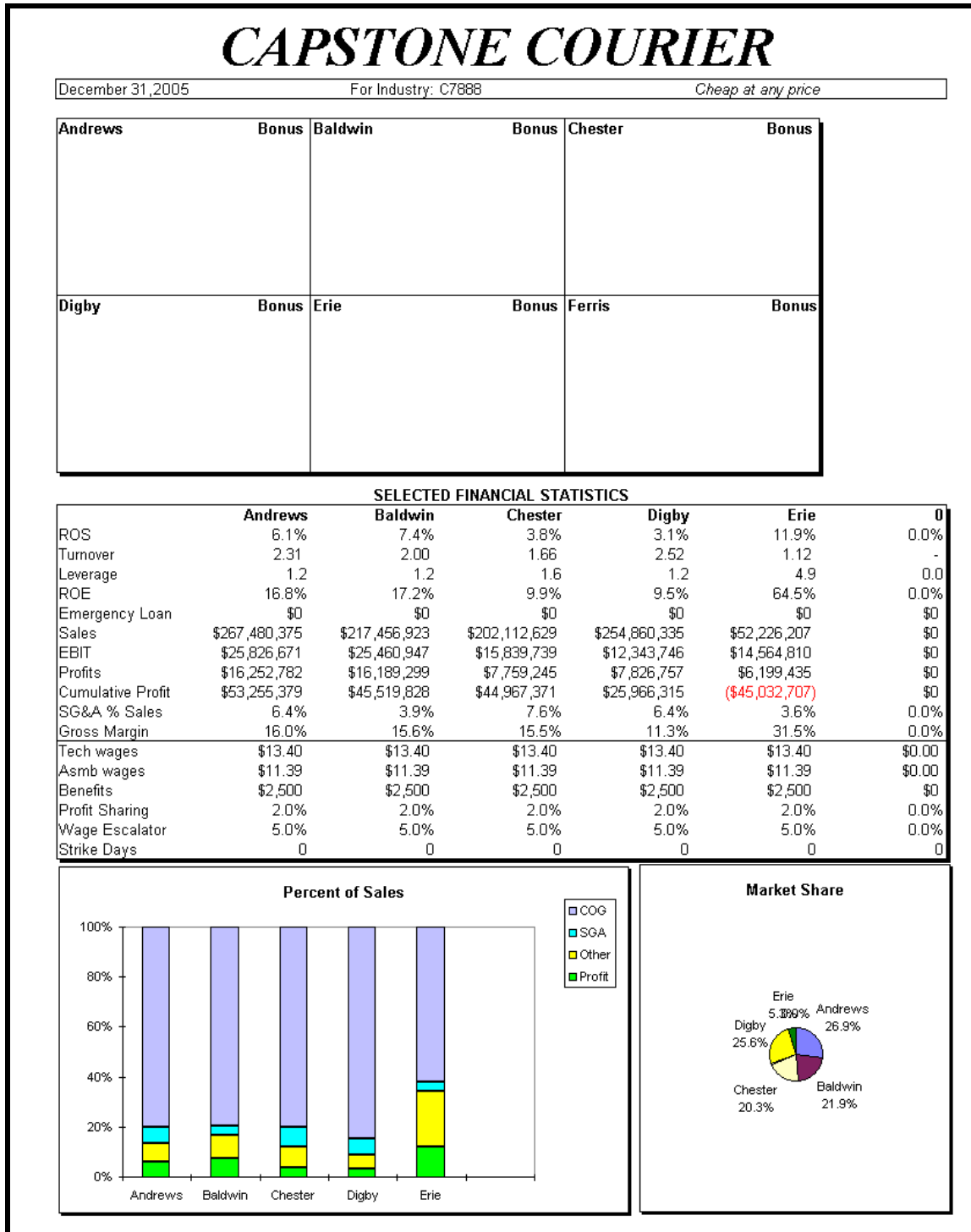
The right-hand column shows the range of possible savings. The exact numbers are determined when the round is processed.

TQM results appear in the HR/TQM Report (see Figure A-8 on page 61).

See "PROCESS MANAGEMENT AND TQM INITIATIVES" on page 26.

REPORTS AND PROFORMAS EXAMPLES

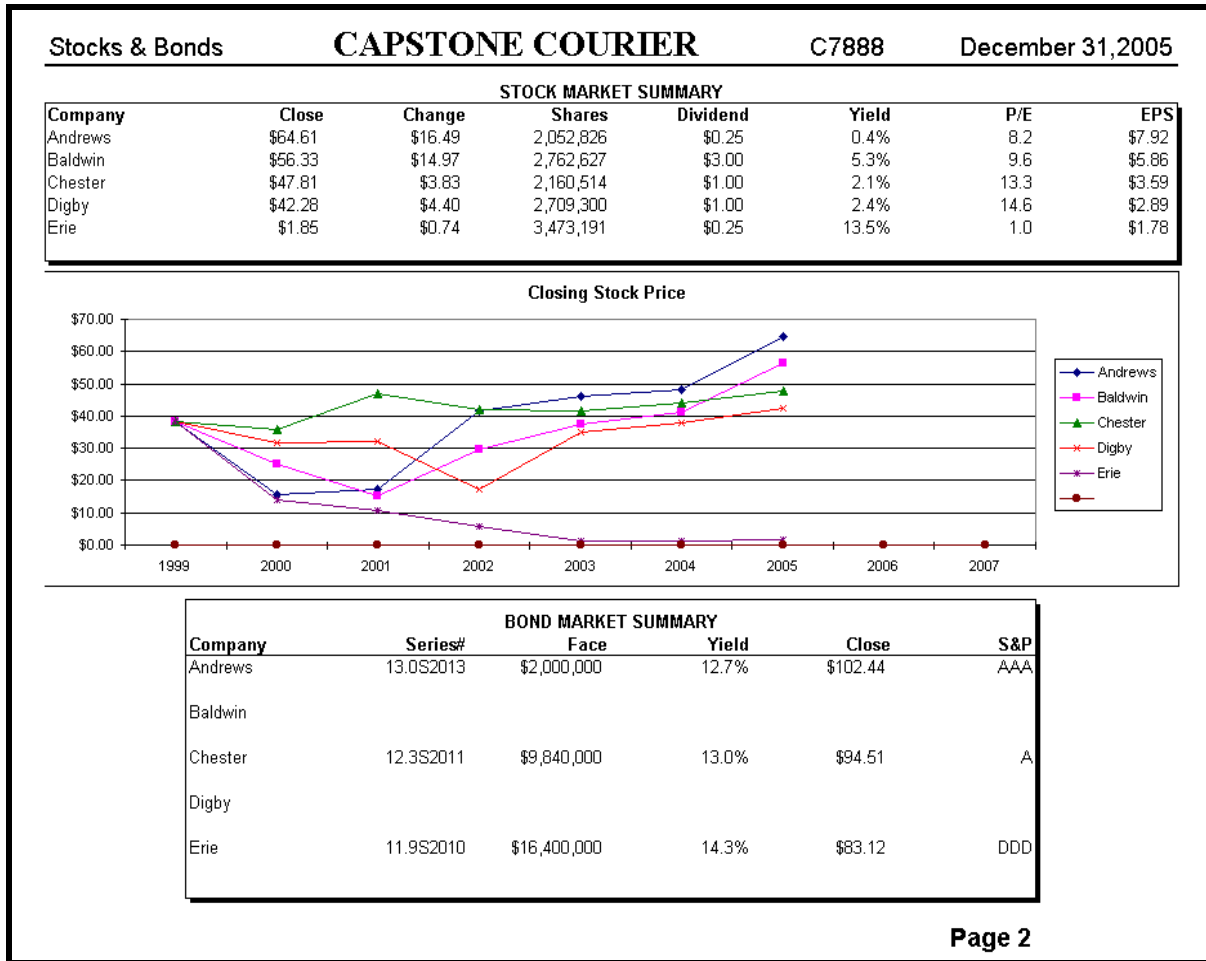
FIGURE A-1



CAPSTONE® COURIER

The Last Year's Reports pull-down menu opens the 12-page *CAPSTONE® COURIER* and the 3-page Annual Report. The front page of the *Courier* (Figure A-1 on page 54) displays industry information including Return on Sales (ROS), Return on Equity (ROE), Earnings Before Interest and Taxes (EBIT) and Selling General & Administrative (SG&A) expenses.

FIGURE A-2



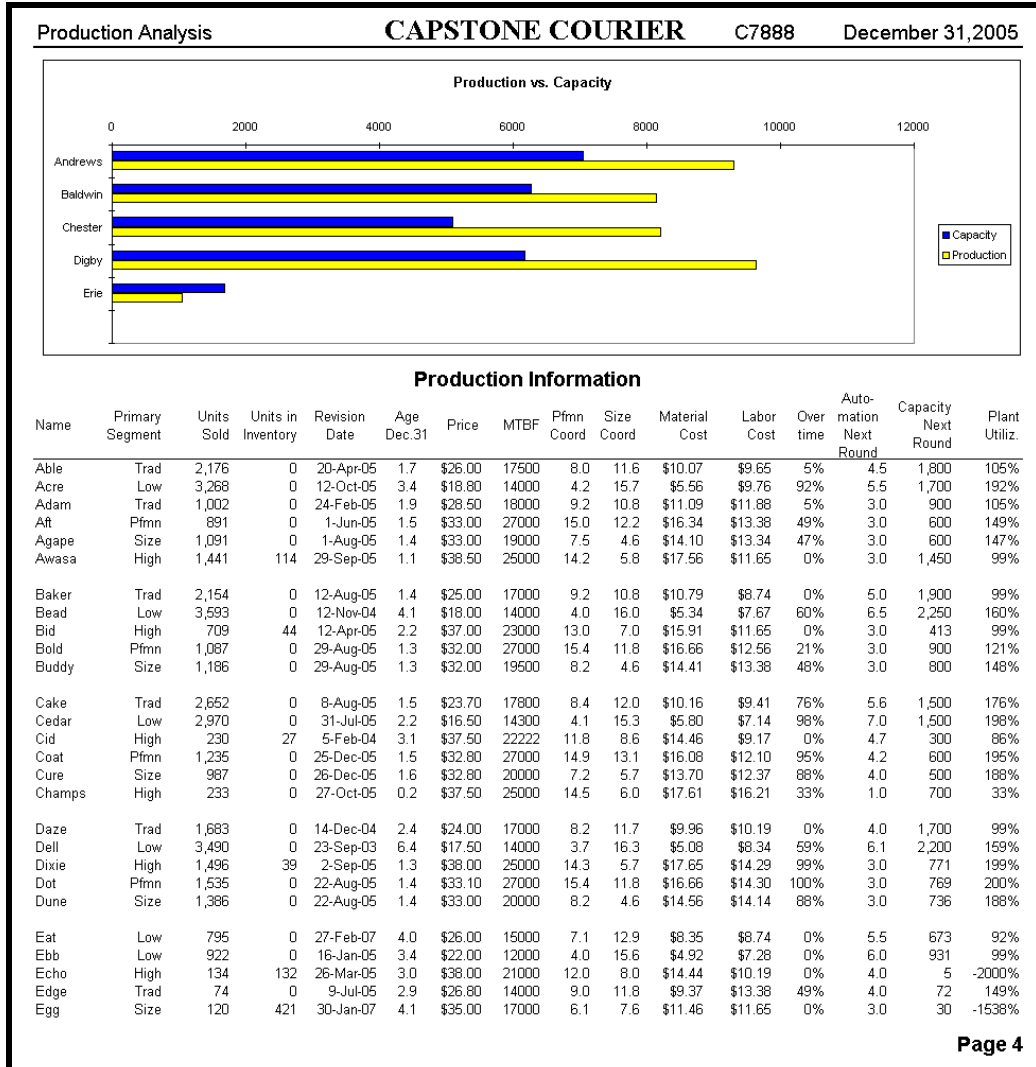
Page 2: **Stock and Bond Summaries** (Figure A-2): Contains stock and bond statistics and a stock history chart.

FIGURE A-3

Financial Analysis	CAPSTONE COURIER					C7888	December 31,2005
Cash Flow Statement Survey	Andrews	Baldwin	Chester	Digby	Erie	0	
Cash flows from operating activities							
Net Income (Loss)	\$16,253	\$16,189	\$7,759	\$7,827	\$6,199	\$0	
Adjustment for non-cash items							
Depreciation	\$10,313	\$10,629	\$8,848	\$9,683	\$3,267	\$0	
Gain/loss on capital equipment sales	\$0	(\$2,805)	(\$2,077)	\$0	(\$8,446)	\$0	
Changes in current assets and liabilities							
Accounts payable	(\$1,351)	\$1,141	\$2,069	\$3,840	(\$1,285)	\$0	
Inventory	\$13,580	\$13,286	\$2,615	(\$1,241)	\$8,706	\$0	
Accounts receivable	(\$1,304)	\$368	(\$1,567)	(\$3,191)	\$3,198	\$0	
Net cash from operations	\$37,491	\$38,808	\$17,647	\$16,918	\$11,639	\$0	
Cash flows from investing activities							
Plant improvements (net)	\$0	\$5,698	\$6,448	\$0	\$18,206	\$0	
Cash flows from financing activities							
Dividends paid	(\$513)	(\$8,288)	(\$2,161)	(\$2,709)	(\$868)	\$0	
Sales of common stock	\$0	\$8,000	\$0	\$0	\$500	\$0	
Purchase of common stock	\$0	\$0	(\$3,500)	(\$5,402)	\$0	\$0	
Cash from long term debt issued	\$0	\$0	\$0	\$0	\$0	\$0	
Retirement of long term debt	(\$21,199)	(\$16,381)	(\$20,750)	(\$21,253)	(\$9,708)	\$0	
Change in current debt	\$449	\$415	\$20,750	\$503	(\$5,830)	\$0	
Net cash from financing activities	(\$21,263)	(\$16,254)	(\$5,661)	(\$28,861)	(\$15,906)	\$0	
Net change in cash position	\$16,228	\$28,252	\$18,434	(\$11,943)	\$13,939	\$0	
Closing cash position	\$30,127	\$33,722	\$52,448	\$24,541	\$13,939	\$0	
Balance Sheet Survey	Andrews	Baldwin	Chester	Digby	Erie	0	
Cash	\$30,127	\$33,722	\$52,448	\$24,541	\$13,939	\$0	
Accounts Receivable	\$21,985	\$7,745	\$16,612	\$20,947	\$4,293	\$0	
Inventory	\$3,327	\$1,196	\$558	\$1,241	\$12,018	\$0	
Total Current Assets	\$55,438	\$42,664	\$69,719	\$46,730	\$30,250	\$0	
Plant and equipment	\$154,700	\$159,434	\$132,720	\$145,248	\$49,008	\$0	
Accumulated Depreciation	(\$94,153)	(\$93,468)	(\$90,702)	(\$90,948)	(\$32,576)	\$0	
Total Fixed Assets	\$60,547	\$65,966	\$52,018	\$54,301	\$16,432	\$0	
Total Assets	\$115,986	\$108,629	\$121,737	\$101,030	\$46,682	\$0	
Accounts Payable	\$16,498	\$13,993	\$13,102	\$17,892	\$1,957	\$0	
Current Debt	\$449	\$415	\$20,750	\$503	\$18,708	\$0	
Long Term Debt	\$2,000	\$0	\$9,840	\$0	\$16,400	\$0	
Total Liabilities	\$18,947	\$14,407	\$43,692	\$18,395	\$37,065	\$0	
Common Stock	\$20,476	\$37,392	\$30,603	\$44,897	\$33,999	\$0	
Retained Earnings	\$76,562	\$56,830	\$47,442	\$37,738	(\$24,382)	\$0	
Total Equity	\$97,039	\$94,222	\$78,045	\$82,635	\$9,617	\$0	
Total Liabilities & Owner's Equity	\$115,986	\$108,629	\$121,737	\$101,030	\$46,682	\$0	
Income Statement Survey	Andrews	Baldwin	Chester	Digby	Erie	0	
Sales	\$267,480	\$217,457	\$202,113	\$254,860	\$52,226	\$0	
COG	\$214,304	\$172,888	\$162,017	\$216,443	\$32,520	\$0	
Depreciation	\$10,313	\$10,629	\$8,848	\$9,683	\$3,267	\$0	
SGA	\$16,725	\$10,644	\$17,433	\$15,998	\$10,280	\$0	
Fees/Bonuses/Writeoffs	\$311	(\$2,166)	(\$2,025)	\$392	(\$8,406)	\$0	
EBIT	\$25,827	\$25,461	\$15,840	\$12,344	\$14,565	\$0	
Interest	\$312	\$46	\$3,659	\$57	\$4,833	\$0	
Taxes	\$8,930	\$8,895	\$4,263	\$4,300	\$3,406	\$0	
Profit Sharing	\$332	\$330	\$158	\$160	\$127	\$0	
Net Profit	\$16,253	\$16,189	\$7,759	\$7,827	\$6,199	\$0	

Page 3: **Financial Analysis** (Figure A-3): Includes Cash Flow Statement, Balance Sheet and Income Statement surveys. These numbers reflect actual round results, versus the Proformas, which are forecasts.

FIGURE A-4



Page 4: **Production Analysis** (Figure A-4): This page shows product segment, specifications, price, cost and production information, and a production data bar chart.

LOOKING AT MARKET SEGMENT ANALYSES

Each round, you will receive five Market Segment Analyses, one report for each product area. The Traditional segment is illustrated in Figure A-5 on page 58.

STATISTICS AND CUSTOMER BUYING CRITERIA: These tables (in the upper-left corner) contain buying statistics and customer preferences.

MARKET SHARE ACTUAL VS. POTENTIAL: This chart tells teams if their products stocked out (or cleared) the market. Stocking out could mean missed sales opportunities. If potential sales far exceed actual, teams might consider building more product, increasing price or reducing sales and promotion budgets. Concurrently, teams that build more units than can be sold (resulting in year-end inventory) might consider reducing production, decreasing price or increasing sales and promotion budgets.

PERCEPTUAL MAP: Displays product grouping within the segment. Teams should check to see if products are ready to leave a segment. If so, demand might shift to other products.

TOP PRODUCTS IN SEGMENT AND ACCESSIBILITY: Teams should check the table at the bottom of the report to find the segment's top seller and determine why it sold. To do so, look at the Accessibility Chart (which reflects the penetration of the sales staff) in the upper-right corner of the page. Teams should also check the Customer Awareness column (which is a function of promotion), the Customer Survey percentage, price and product specifications. Using the Segment Analysis, teams should be able to determine why the top seller was successful and develop tactics to maintain or enhance their products' positioning. Successful teams will determine segment demand for the upcoming round by multiplying Total Industry Unit Demand by the Growth Rate. They will also determine segment capacity using the Production Information on Page 4 (Figure A-4 on page 57). They will then judge the products in each segment on their relative merits (positioning, MTBF, price, awareness, accessibility, etc.). Using these data, they will begin to estimate a Sales Forecast, which is entered for each product in the Your Sales Forecast cell on the Marketing Spreadsheet.

FIGURE A-5

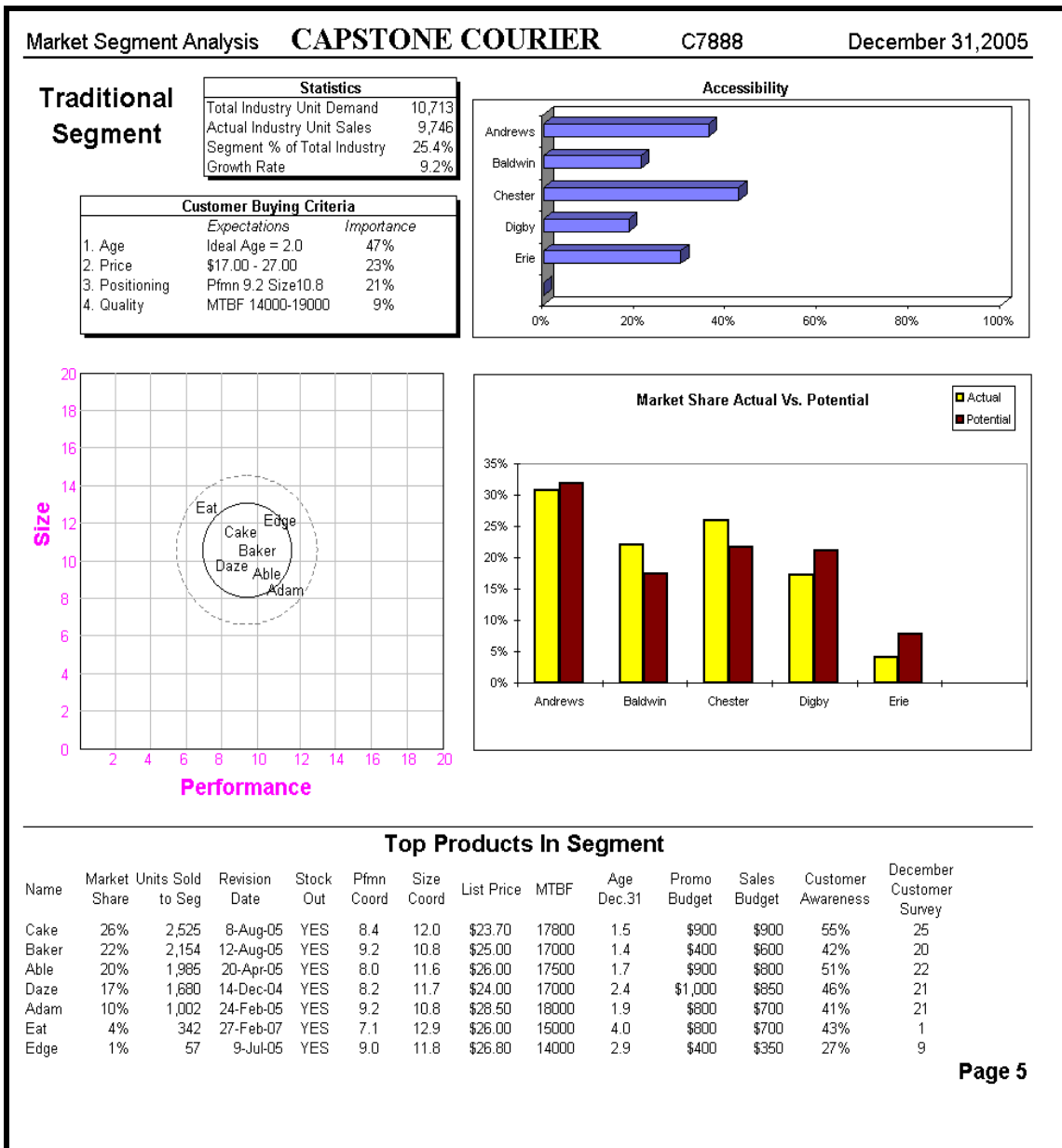
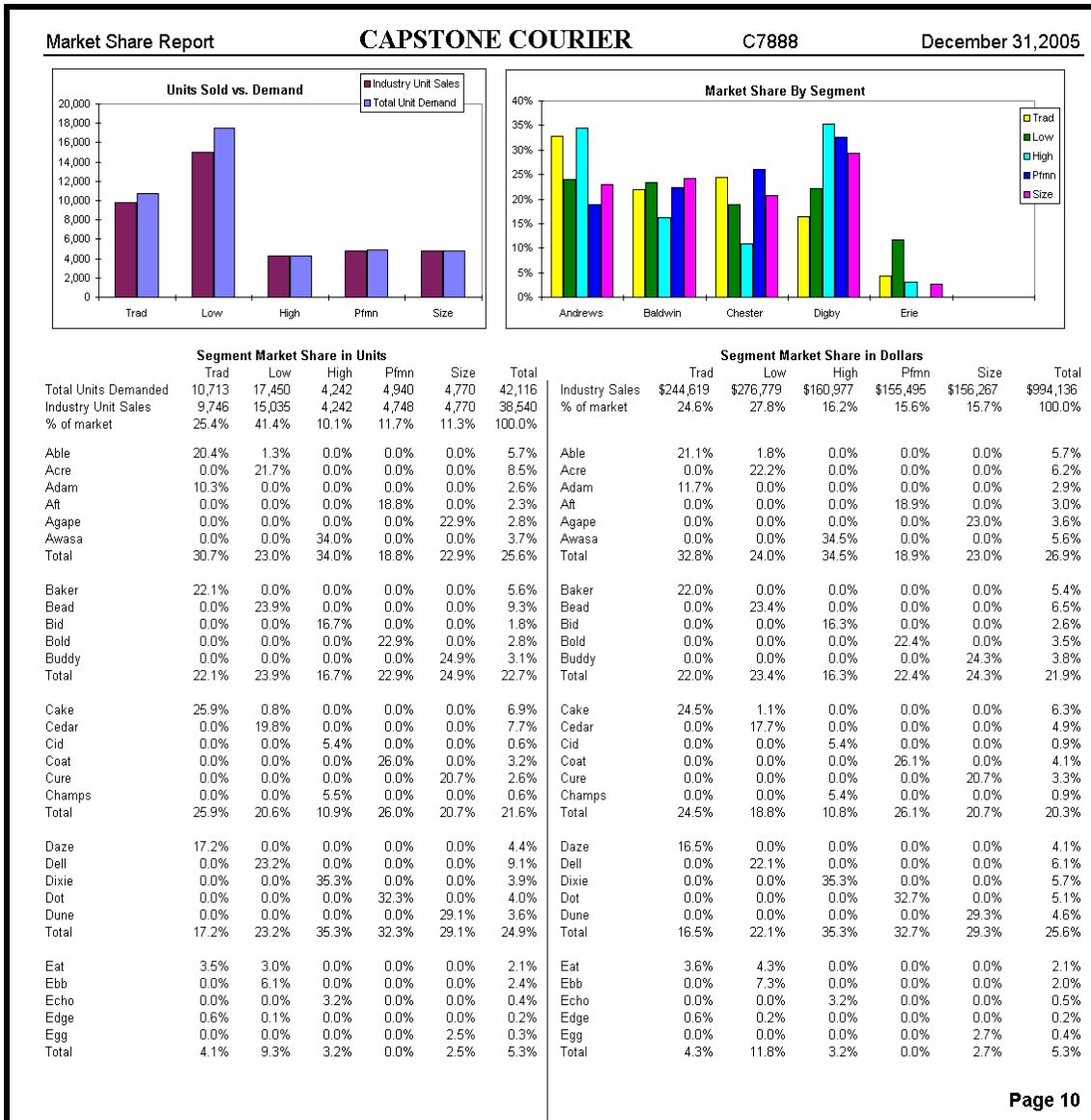
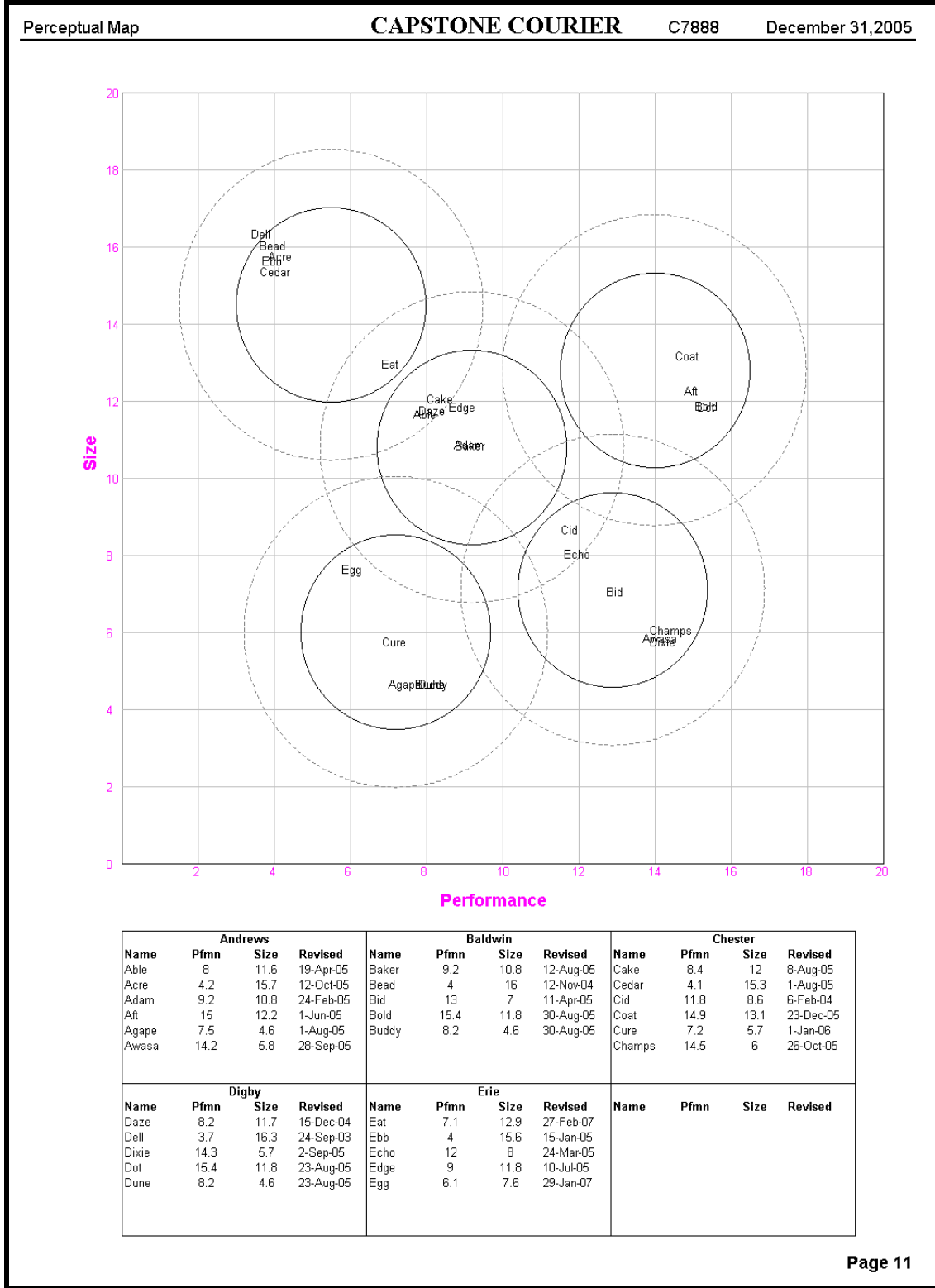


FIGURE A-6



Page 10: Market Share Report (Figure A-6): Contains numeric and graphical sales information for all products.

FIGURE A-7



Page 11: **Perceptual Map** (Figure A-7): Shows performance statistics and plots locations of all products on December 31 of the previous year.

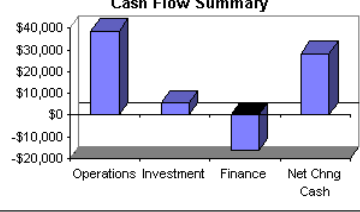
FIGURE A-8

HR/TQM Report	CAPSTONE COURIER			C7888	December 31, 2005	
HUMAN RESOURCES SUMMARY						
	Andrews	Baldwin	Chester	Digby	Erie	Ferris
1st Shift Complement	636	603	610	750	632	647
2nd Shift Complement	58	43	58	0	79	0
Complement	694	646	668	750	711	647
Overtime%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Turnover Rate	10.7%	11.4%	15.2%	15.2%	11.0%	11.0%
New Employees	74	74	101	164	89	71
Separated Employees	6	54	32	0	0	53
Recruiting Spend	\$0	\$0	\$0	\$0	\$0	\$0
Training Hours	0	0	0	0	0	0
Productivity Index	1.00	1.00	1.00	1.00	1.00	1.00
Recruiting Cost	\$74	\$74	\$101	\$164	\$89	\$71
Separation Cost	\$30	\$270	\$160	\$0	\$0	\$265
Training Cost	\$0	\$0	\$0	\$0	\$0	\$0
Total HR Admin Costs	\$104	\$344	\$261	\$164	\$89	\$336
Labor Contract Next Year						
Wages	\$24.00	\$23.00	\$21.90	\$23.00	\$23.55	\$23.00
Benefits	\$2,625	\$2,725	\$2,475	\$2,625	\$2,675	\$2,750
Profit Sharing	2.1%	2.1%	1.6%	1.1%	2.1%	2.1%
Annual Raise	5.3%	5.3%	3.9%	2.8%	5.3%	5.5%
Starting Negotiation Position						
Wages	\$24.00	\$20.00	\$18.00	\$20.00	\$21.00	\$22.00
Benefits	\$2,500	\$2,500	\$2,000	\$2,500	\$2,600	\$2,750
Profit Sharing	2.0%	2.0%	1.0%	0.0%	2.0%	2.1%
Annual Raise	5.0%	5.0%	2.0%	0.0%	5.0%	5.5%
Ceiling Negotiation Position						
Wages	\$26.40	\$22.00	\$19.80	\$22.00	\$23.10	\$24.20
Benefits	\$2,750	\$2,700	\$2,200	\$2,750	\$2,860	\$3,025
Profit Sharing	2.2%	2.2%	1.1%	0.0%	2.2%	2.3%
Annual Raise	5.5%	5.5%	2.2%	0.0%	5.5%	6.1%
Adjusted Labor Demands						
Wages	\$24.00	\$24.00	\$24.00	\$24.00	\$24.00	\$24.00
Benefits	\$2,750	\$2,750	\$2,750	\$2,750	\$2,750	\$2,750
Profit Sharing	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Annual Raise	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
Strike Days	0	15	73	68	6	0
TQM SUMMARY						
Process Management Budgets Last Year (\$M)						
	Andrews	Baldwin	Chester	Digby	Erie	Ferris
CPI Systems	\$0	\$0	\$0	\$0	\$0	\$0
Vendor/JIT	\$0	\$0	\$0	\$0	\$0	\$0
Quality Initiative Training	\$0	\$0	\$0	\$0	\$0	\$0
Channel Support Systems	\$0	\$0	\$0	\$0	\$0	\$0
Concurrent Engineering	\$0	\$0	\$0	\$0	\$0	\$0
TQM Budgets Last Year (\$M)						
Benchmarking	\$0	\$0	\$0	\$0	\$0	\$0
Quality Function Deployment Effort	\$0	\$0	\$0	\$0	\$0	\$0
CCE/6 Sigma Training	\$0	\$0	\$0	\$0	\$0	\$0
Total Expenditures (\$000)	\$0	\$0	\$0	\$0	\$0	\$0
Cumulative Impacts						
Material Cost Reduction	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Labor Cost Reduction	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Reduction R&D Cycle Time	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Reduction in Admin Costs	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Demand increase	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Page 12: **HR/TQM Report** (Figure A-8): The upper part of the report shows Human Resources costs, including Recruitment and Separation charges (which are generated by changes in Production Schedule, capacity and automation). Wages and Benefits for the upcoming round are also included.

Process Management and Total Quality Management investments (if enabled) and their cumulative impacts appear in the lower part of the report.

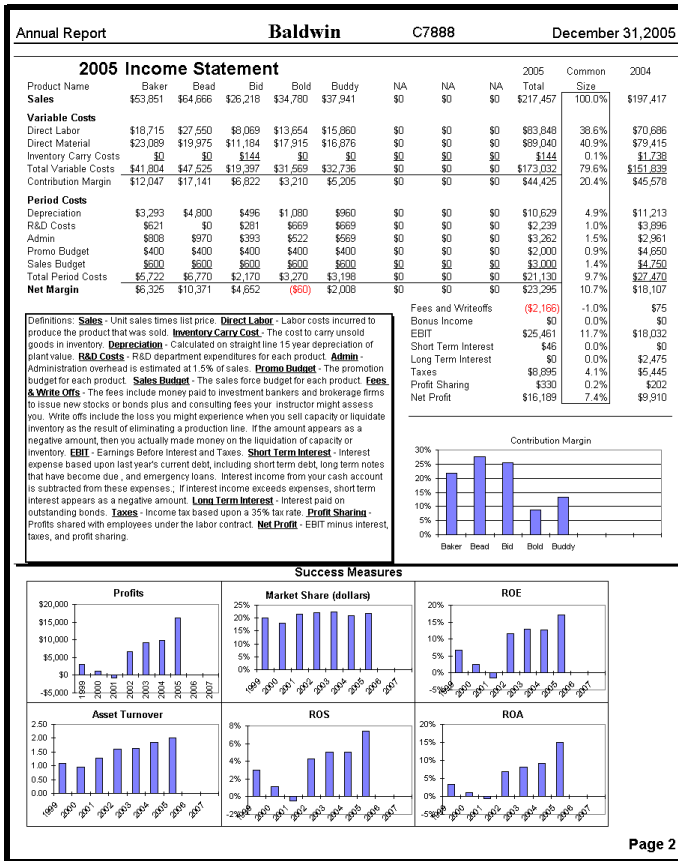
FIGURE A-9

Annual Report	Baldwin	C7888	December 31, 2005																																																																																			
Balance Sheet																																																																																						
<p>Definitions: Common Size - The common size column simply represents each item as a percentage of total assets. Cash - Your end of year cash position.</p> <p>Accounts Receivable - Reflects the lag between delivery and payment of your products. Inventories - The current value of your inventory across all products. A zero indicates your company stocked out. Unmet demand would, of course, fall to your competitors.</p> <p>Plant & Equipment - The current value of your plant. Accum Deprec - The total accumulated depreciation from your plant. Accts Payable - What the company currently owes suppliers for materials and services.</p> <p>Current Debt - The debt the company is obligated to pay during the next year of operations. It includes your short term debt, bonds that have matured this year, and emergency loans used to keep your company solvent should you run out of cash during the year. Long Term Debt - The company's long term debt is in the form of bonds, and this represents the total of those bonds.</p> <p>Common Stock - The amount of capital invested by shareholders in the company. Retained Earnings - The profits that the company chose to keep instead of paying to shareholders as dividends.</p>	<table border="1"> <thead> <tr> <th></th> <th></th> <th>2005</th> <th>2004</th> </tr> <tr> <th></th> <th></th> <th>Common Size</th> <th></th> </tr> </thead> <tbody> <tr> <td colspan="5">ASSETS</td> </tr> <tr> <td>Cash</td> <td>\$33,722</td> <td>31.0%</td> <td>\$5,471</td> </tr> <tr> <td>Accounts Receivable</td> <td>\$7,745</td> <td>7.1%</td> <td>\$8,113</td> </tr> <tr> <td>Inventory</td> <td>\$1,196</td> <td>1.1%</td> <td>\$14,482</td> </tr> <tr> <td>Total Current Assets</td> <td>\$42,663</td> <td>39.3%</td> <td>\$28,066</td> </tr> <tr> <td>Plant & Equipment</td> <td>\$159,434</td> <td>146.8%</td> <td>\$168,200</td> </tr> <tr> <td>Accumulated Depreciation</td> <td>(\$93,468)</td> <td>-86.0%</td> <td>(\$88,713)</td> </tr> <tr> <td>Total Fixed Assets</td> <td>\$65,966</td> <td>60.7%</td> <td>\$79,487</td> </tr> <tr> <td>Total Assets</td> <td>\$108,629</td> <td>100.0%</td> <td>\$107,553</td> </tr> <tr> <td colspan="5">LIABILITIES & OWNER'S EQUITY</td> </tr> <tr> <td>Accounts Payable</td> <td>\$13,993</td> <td>12.9%</td> <td>\$12,851</td> </tr> <tr> <td>Current Debt</td> <td>\$415</td> <td>0.4%</td> <td>\$0</td> </tr> <tr> <td>Long Term Debt</td> <td>\$0</td> <td>0.0%</td> <td>\$15,966</td> </tr> <tr> <td>Total Liabilities</td> <td>\$14,408</td> <td>13.3%</td> <td>\$28,817</td> </tr> <tr> <td>Common Stock</td> <td>\$37,392</td> <td>34.4%</td> <td>\$29,392</td> </tr> <tr> <td>Retained Earnings</td> <td>\$56,830</td> <td>52.3%</td> <td>\$49,343</td> </tr> <tr> <td>Total Equity</td> <td>\$94,222</td> <td>86.7%</td> <td>\$78,735</td> </tr> <tr> <td>Total Assets</td> <td>\$108,629</td> <td>100.0%</td> <td>\$107,553</td> </tr> </tbody> </table>						2005	2004			Common Size		ASSETS					Cash	\$33,722	31.0%	\$5,471	Accounts Receivable	\$7,745	7.1%	\$8,113	Inventory	\$1,196	1.1%	\$14,482	Total Current Assets	\$42,663	39.3%	\$28,066	Plant & Equipment	\$159,434	146.8%	\$168,200	Accumulated Depreciation	(\$93,468)	-86.0%	(\$88,713)	Total Fixed Assets	\$65,966	60.7%	\$79,487	Total Assets	\$108,629	100.0%	\$107,553	LIABILITIES & OWNER'S EQUITY					Accounts Payable	\$13,993	12.9%	\$12,851	Current Debt	\$415	0.4%	\$0	Long Term Debt	\$0	0.0%	\$15,966	Total Liabilities	\$14,408	13.3%	\$28,817	Common Stock	\$37,392	34.4%	\$29,392	Retained Earnings	\$56,830	52.3%	\$49,343	Total Equity	\$94,222	86.7%	\$78,735	Total Assets	\$108,629	100.0%	\$107,553
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Plant & Equipment	\$159,434	146.8%	\$168,200																																																																																			
Accumulated Depreciation	(\$93,468)	-86.0%	(\$88,713)																																																																																			
Total Fixed Assets	\$65,966	60.7%	\$79,487																																																																																			
Total Assets	\$108,629	100.0%	\$107,553																																																																																			
LIABILITIES & OWNER'S EQUITY																																																																																						
Accounts Payable	\$13,993	12.9%	\$12,851																																																																																			
Current Debt	\$415	0.4%	\$0																																																																																			
Long Term Debt	\$0	0.0%	\$15,966																																																																																			
Total Liabilities	\$14,408	13.3%	\$28,817																																																																																			
Common Stock	\$37,392	34.4%	\$29,392																																																																																			
Retained Earnings	\$56,830	52.3%	\$49,343																																																																																			
Total Equity	\$94,222	86.7%	\$78,735																																																																																			
Total Assets	\$108,629	100.0%	\$107,553																																																																																			
Cash Flow Statement																																																																																						
<p>The Cash Flow Statement examines what happened in the Cash Account during the year. Cash injections appear as positive numbers and cash withdrawals as negative numbers.</p> <p>The Cash Flow Statement is an excellent tool for diagnosing emergency loans. When negative cash flows exceed positives, you are forced to seek emergency funding. For example, if sales are bad and you find yourself carrying an abundance of excess inventory, the report would show the increase in inventory as a huge negative cash flow. Too much unexpected inventory could outstrip your inflows, exhaust your starting cash, and force you to beg for money to keep you afloat.</p>	<table border="1"> <thead> <tr> <th></th> <th>2005</th> <th>2004</th> </tr> </thead> <tbody> <tr> <td colspan="3">Cash Flows from Operating Activities</td> </tr> <tr> <td>Net Income (Loss)</td> <td>\$16,189</td> <td>\$9,910</td> </tr> <tr> <td>Adjustment for non-cash items</td> <td></td> <td></td> </tr> <tr> <td> Depreciation</td> <td>\$10,629</td> <td>\$11,213</td> </tr> <tr> <td> Gain/Loss on capital equipment sales</td> <td>(\$2,805)</td> <td>\$0</td> </tr> <tr> <td>Change in Current Assets and Liabilities</td> <td></td> <td></td> </tr> <tr> <td> Accounts Payable</td> <td>\$1,141</td> <td>\$1,243</td> </tr> <tr> <td> Inventory</td> <td>\$13,286</td> <td>(\$6,256)</td> </tr> <tr> <td> Accounts Receivable</td> <td>\$368</td> <td>\$1,878</td> </tr> <tr> <td>Net cash from operations</td> <td>\$38,808</td> <td>\$17,989</td> </tr> <tr> <td colspan="3">Cash Flows From Investing Activities</td> </tr> <tr> <td>Plant Improvements</td> <td>\$5,698</td> <td>(\$4,800)</td> </tr> <tr> <td colspan="3">Cash Flows from Financing Activities</td> </tr> <tr> <td>Dividends Paid</td> <td>(\$8,288)</td> <td>(\$1,285)</td> </tr> <tr> <td>Sales of Common Stock</td> <td>\$8,000</td> <td>\$0</td> </tr> <tr> <td>Purchase of Common Stock</td> <td>\$0</td> <td>\$0</td> </tr> <tr> <td>Cash from long term debt</td> <td>\$0</td> <td>\$0</td> </tr> <tr> <td>Retirement of long term debt</td> <td>(\$16,381)</td> <td>(\$5,000)</td> </tr> <tr> <td>Change in current debt (net)</td> <td>\$415</td> <td>(\$8,833)</td> </tr> <tr> <td>Net cash from financing activities</td> <td>(\$16,254)</td> <td>(\$15,118)</td> </tr> <tr> <td>Net change in cash position</td> <td>\$28,252</td> <td>(\$1,929)</td> </tr> <tr> <td>Closing cash position</td> <td>\$33,722</td> <td>\$5,471</td> </tr> </tbody> </table>					2005	2004	Cash Flows from Operating Activities			Net Income (Loss)	\$16,189	\$9,910	Adjustment for non-cash items			Depreciation	\$10,629	\$11,213	Gain/Loss on capital equipment sales	(\$2,805)	\$0	Change in Current Assets and Liabilities			Accounts Payable	\$1,141	\$1,243	Inventory	\$13,286	(\$6,256)	Accounts Receivable	\$368	\$1,878	Net cash from operations	\$38,808	\$17,989	Cash Flows From Investing Activities			Plant Improvements	\$5,698	(\$4,800)	Cash Flows from Financing Activities			Dividends Paid	(\$8,288)	(\$1,285)	Sales of Common Stock	\$8,000	\$0	Purchase of Common Stock	\$0	\$0	Cash from long term debt	\$0	\$0	Retirement of long term debt	(\$16,381)	(\$5,000)	Change in current debt (net)	\$415	(\$8,833)	Net cash from financing activities	(\$16,254)	(\$15,118)	Net change in cash position	\$28,252	(\$1,929)	Closing cash position	\$33,722	\$5,471													
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<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;"> <p style="text-align: center;">Cash Flow Summary</p>  </div> </div>																																																																																						

ANNUAL REPORTS

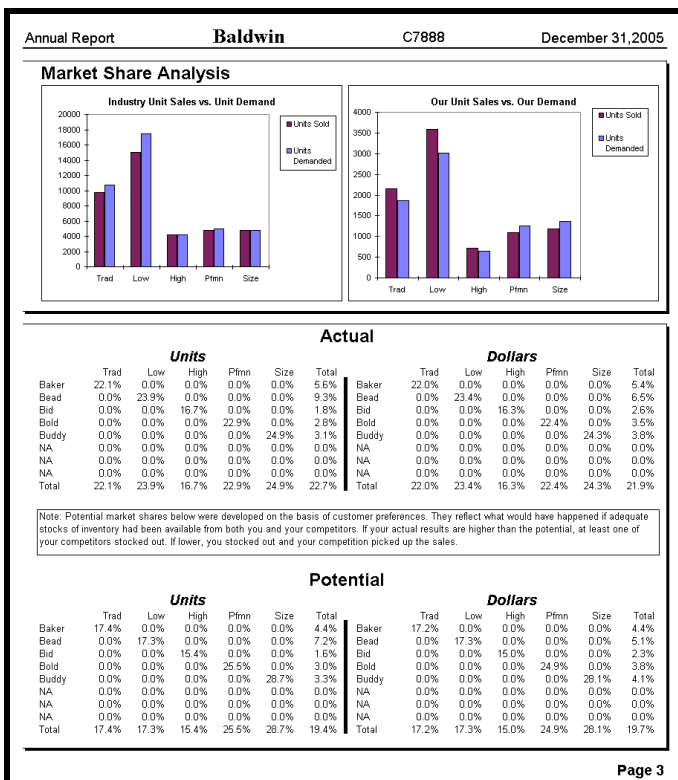
Annual Report, Page 1 (Figure A-9): Includes **Balance Sheet** and **Cash Flow Statement**.

FIGURE A-10



Annual Report, Page 2 (Figure A-10): Shows Product Sales, Period Costs, and a Contribution Margin bar chart.

FIGURE A-11



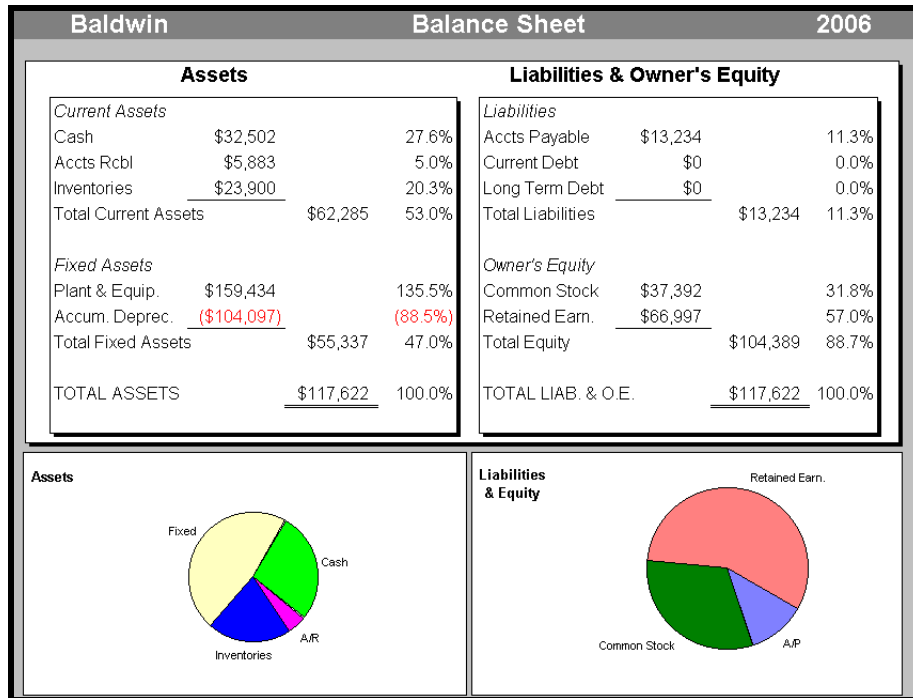
Annual Report, Page 3 (Figure A-11): Market Share Analysis displays industry and company sales statistics.

PROFORMAS

Proformas are predictions of the coming round based on the decisions that have been entered on the spreadsheets. Four reports and a decision summary are available from the Proforma menu.

Proformas,
Page 1 (Figure A-12) **Balance Sheet:** Results based on R&D, Marketing, Production and Financial decisions.

FIGURE A-12



Proformas,
Page 2 (Figure A-13) **Income Statement:** Includes table and chart representation of product costs and revenues.

FIGURE A-13

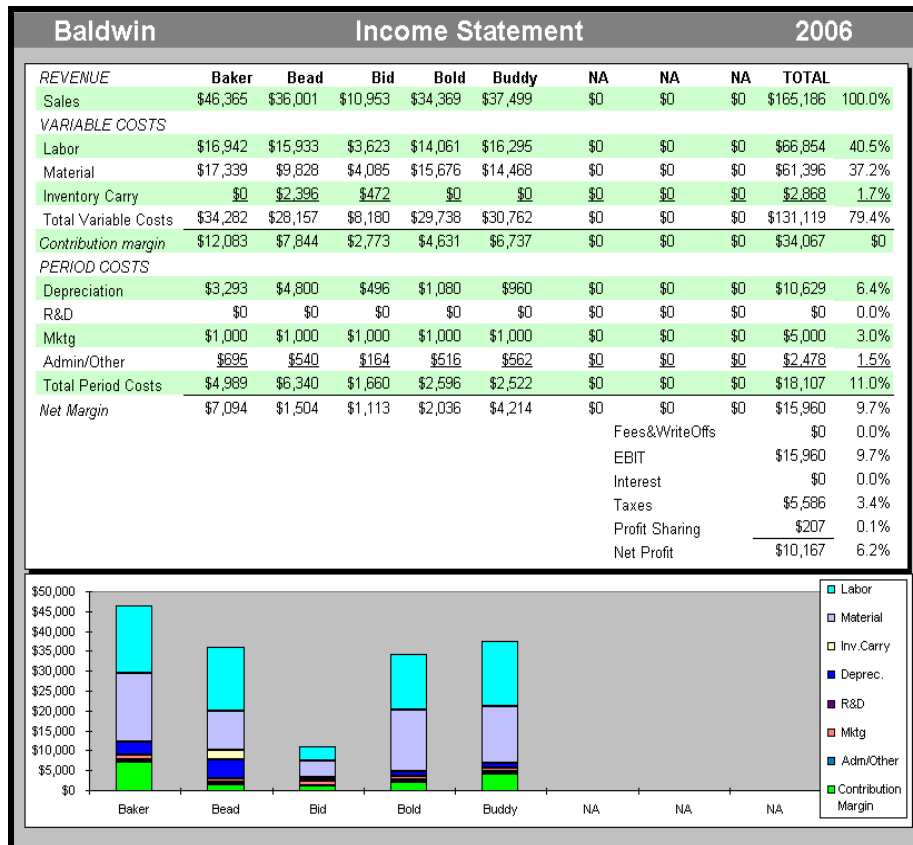
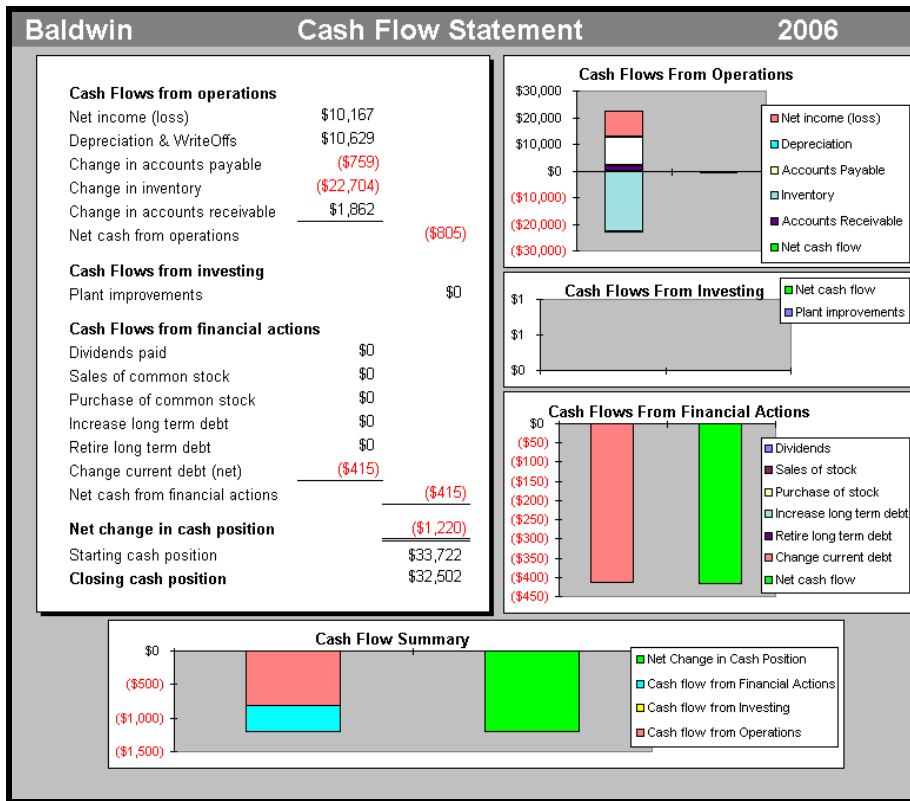
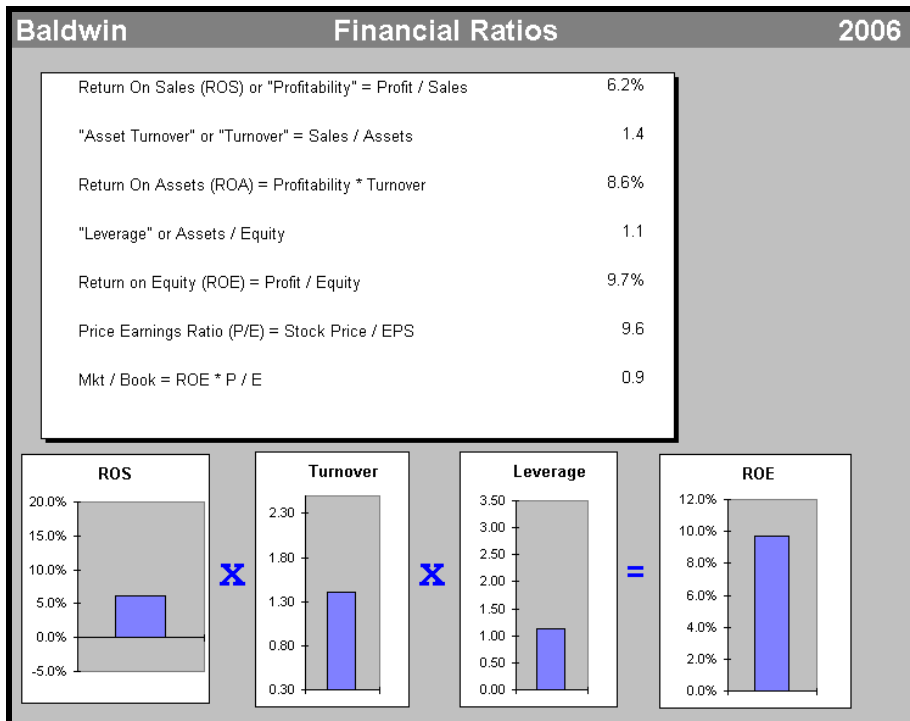


FIGURE A-14



Proformas, Page 3 (Figure A-14): **Cash Flow Statement** breaks cash expenditures into three categories.

FIGURE A-15



Proformas, Page 4 (Figure A-15): **Financial Ratios** has several equations and a bar chart representation of the DuPont Chain (ROS x Turnover x Leverage = ROE).

GLOSSARY

A

Accessibility

The ability of the customer to gain access to a product. The higher the Accessibility, the more easily a customer can find and purchase a product.

Accounts Payable (A/P)

Amount owed to suppliers for materials. The A/P Lag (expressed in days) can be adjusted on the Marketing screen.

Accounts Receivable (A/R)

The amount of money owed to the company. The A/R Lag (expressed in days) can be adjusted on the Marketing screen.

Accumulated Depreciation

Cumulative total of each year's depreciation charge for plant and equipment. A 15-year, straight line depreciation method is used.

Actual Industry Unit Sales

Units actually sold into the segment from all products represented. If this value is lower than the Total Available Unit Demand then insufficient units were produced for sale into the segment.

Admin

Cost of general administration, e.g., legal services, accounting, human resources. The value is calculated as 1.5% of total sales for each product line.

Age

The preferred Perceived Age customers would like a product to possess. Perceived Age is affected by redesigning (changing the performance attribute, size attribute, or both) the product.

Age Dec. 31

Perceived Age as of December 31 of the year just ended. Remember that every time a product is redesigned its perceived age is halved.

Assets

All property and claims owned by a business. Assets include cash, inventory and Accounts Receivable.

Asset Turnover

Sales, generated in a particular year, divided by the value of total assets for the same period.

Automation Next Round

The automation on each production line during the coming round.

Awareness

Investment in Promotion creates awareness. The higher the awareness, the more likely a customer is going to decide to buy the product. The maximum awareness is 100%.

B

Benefits

Benefits package for each employee.

Bonds

The value of all outstanding Bonds which will become due at some future date. Long term interest is paid on outstanding Bonds.

C

Capacity Next Round

The First Shift Capacity of each of production line during the coming round.

Cash Flows from Investing Activities

Activities from purchasing or selling plant and equipment plus all cash flow movements involved with Stocks, Bonds and Current Debt.

Cash Flow Statement

This statement is published in conformity with the Finance and Accounting Standards Board's (FASB) most recent statements and opinions on the format for a cash flow analysis.

Cash from Long Term Debt

Cash received for issuing new, ten-year, bonds.

Change in Current Assets and Liabilities

Assets and liabilities that have either increased or decreased since last year's balance sheet.

Change in Current Debt

This is the net value of any current debt that we owed (and therefore had to pay) last year and any additional current debt we took on.

Closing Cash Position

Value in the cash account at the end of this year, also shown on the Balance Sheet.

Cumulative Free Cash Flow

The sum of all of the Free Cash Flows since you took over management of the company.

Cumulative Profits

Cumulative total of all profits (losses) generated since the game's inception.

Current Assets

Cash plus Accounts Receivable and Inventory.

Current Debt

The value of debt owed and payable on January 1 of the year for which decisions are currently being made.

Current Liabilities

Current Debt plus Accounts Payable.

Current Ratio

$\text{Current Assets} / \text{Current Liabilities} = (\text{Cash} + \text{A/R} + \text{Inventory}) / (\text{A/P} + \text{Current Debt})$.

Customer Awareness

That portion of the total segment that was aware of a particular product.

D

December Customer Survey

This is an assessment of the desirability of a product (considering age, MTBF, price and positioning) as of December 31 of the year just ended. The scale ranges from 0, not at all desirable, to 100, highly desirable.

Days of Working Capital

Working Capital / (Sales/365)

Depreciation

Although depreciation is expensed on the Income Statement, no company check was actually written. Depreciation is an accounting for that portion of the equipment that was “used up” in the period. The government recognizes this wear and tear and allows us to deduct it before declaring a profit. We must add it back here to get a true picture of our cash account. Annual depreciation for plant and equipment uses a 15-year, straight line, depreciation schedule.

Dividend

The Dividend declared, per share.

E**Earnings Before Interest and Taxes (EBIT)**

Net margin less fees and write-offs and bonus income.

Emergency Loan

A cash injection during the year when the company runs out of money. This might happen because expected sales fail to materialize.

Emergency Loans have an interest rate 7.5% above current rates.

EPS

EPS is calculated by dividing net profit into the number of shares outstanding.

EQUITY

Common Stock plus Retained Earnings.

F**Face Value**

The face value of the entire issue. This value is also what would be paid back to the bondholders at the maturity of the debt. However, if bonds are retired early the “Street Price” paid may be higher or lower than this.

Fees and Write-offs

This is a compilation of charges that may be incurred during any given period. Including Bond and Stock issuing fees (5%), Stock and early Bond retirement fees (1.5%), consultation fees (as determined by the instructor), gains or losses on the sale of plant and losses on the liquidation of any inventory (liquidated at half its cost of production).

First (1st) Shift Capacity

The total number of products that can be built by a single shift in a year.

Free Cash Flow

The money left after investment that a company could either put in the bank or give to shareholders as dividends.

G**Gain/Loss on Equipment Sales**

If machinery is sold (preset scrap rate of 65% of original value) at a value that is higher than the net or depreciated value of the machinery, then this shows up as a profit on the Income Statement. Conversely if the scrap value is less than the depreciated value then this is a loss. Such gains and losses must be reported on the Income Statement. However they do not represent a true movement of cash.

The cash flow is the total amount received for selling off the line, this amount is shown in the Cash Flows from Investing section of the Cash Flow Statement.

I**Income Statement**

The Income Statement, also known as a Profit and Loss Statement, shows the entire value that an account has accumulated over the previous period (in this case twelve months).

Industry Units Sold vs. Demand

Total units sold by all teams, compared to the volume demanded by each segment.

Inventory Carrying Costs

Value of units left in inventory (total unit cost) multiplied by a penalty of 12%.

Inventory (Value)

The value of inventory on hand valued using “average cost accounting.” This will rise and fall based on the production scheduled (entered on the Production screen) versus units sold.

L**Labor Cost**

The per unit cost of labor in the year just ended.

Leverage

Total assets at the end of the period under review divided by owners' equity for the same period.

List Price

Price charged for the product in the round just ended.

Long Term Debt

The value of all outstanding Bonds which will become due at some future date. Long term interest is paid on outstanding Bonds.

M**Market Share**

On the Market Share Report, share of market achieved by each product in each segment. The market shares based on units are shown in the left-hand group of columns and the market shares based on dollars are shown in the right-hand group of columns.

Market Share Actual vs. Potential

On the Market Segment Reports, compares what was sold by a team into a segment (Actual) with what the team would have sold if they (or competitors) had produced sufficient inventory (Potential). Market Share Potential indicates what a product should have earned if all products had been manufactured in sufficient quantity. In cases where Actual is larger than Potential, other teams ran out of product and “chased” demand to an inferior product. In cases where Potential is larger than Actual, then the product stocked out and chased demand to other teams.

Material Cost

Cost of raw material necessary to manufacture a product. This value is impacted by positioning and reliability (Mean

Time Between Failure, expressed in hours) specified on the R&D screen. Also, there is a learning curve impact. If products are not redesigned, there is an improvement in worker efficiency, year after year, resulting in average decrease in cost of about \$0.60 per unit.

MTBF

Mean Time Between Failure. Reliability of product, expressed in hours.

N**Net Cash from Operations**

Sub-total of all activities on the cash flow statement to this point. Conceptually it is the actual cash either generated (if positive) or used up (if negative) by the core activities of the business. The remainder of the cash flow statement summarizes activities involved in either capital budgeting or tax and treasury activities.

Net Change in Cash Position

The difference between the balance in the cash account at the end of last year and the value of cash account at the end of this year. The entire Cash Flow Statement is designed to reconcile to this value.

Net Income

Value of profits as calculated on the Income Statement.

Net Margin

Value of total sales less variable and period costs.

Net Profit

Earnings left after all expenses are paid. Net profit can only be allocated to one of two directions. It is either paid out to the owners of the business, in the form of a dividend or it is retained in the business to grow the company and is thus added to the Retained Earnings of the business.

P**Percent of Market**

On the Market Share Report, share of total units sold, represented by each segment of the market.

P/E Ratio

The closing stock price divided by the earnings per share or EPS. The P/E is sometimes referred to as the earnings multiple or simply the multiple.

Period Costs

Costs that generally tend not to move in proportion to sales volume.

Plant Utiliz.

Volume actually produced during the previous round compared to the actual capacity for that round. Levels in excess of 100% indicate a Second Shift was utilized.

Plant and Equipment (Value)

Gross value of capacity and automation available (or purchased) for each production line.

Plant Improvements

Net value, after deducting any equipment sold for scrap, of cash invested in automation and capacity.

Positioning

A product's performance and size coordinates on the Perceptual Map.

Price

Price charged for a product this year.

Primary Segment

The segment into which the largest proportion of this product was sold.

Production vs. Capacity

Number of units actually built versus the straight time capacity of the entire plant for the year just ended. When production is larger than capacity, a Second Shift must have been scheduled in order to achieve the production level.

Profits

This shows the dollar profit earned each year since the game's inception.

Profit Sharing

That share of the profits paid to technicians and assemblers as per the union agreement.

Promotion Budget

Value of monies expended on media advertising, as set on the Marketing screen.

Purchase of Common Stock (value)

Value of cash used in buying back stock. Stock is repurchased at its spot price as of December 31 of the year just ended. The maximum buy back in any round is 5% of total outstanding.

R**R&D Costs**

Annual costs associated with either redesigning an existing, or designing an entirely new, product. If an R&D project is more than a year, then the cost will be charged over the full life of the project, with a maximum of one million dollars charged on a single project, in a single year. For example, if a project is estimated to cost \$1.5M then \$1M will be charged on this year's Income Statement and \$.5M will be charged next year.

Retained Earnings

Total of all company profits and losses over the life of the company, less any Dividends paid out. The monies are captured in the Assets of the company. This may be cash but it may just as easily be in the form of plant or even accounts receivable.

Retire Long Term Debt

Cash consumed in the early retirement of bonds that are outstanding. These bonds are retired at the value at which they were trading (street value).

Revision Date

The last time product came out of a redesign cycle, in R&D, or the next time it will come out of the redesign cycle if it is currently being redesigned.

ROA

Net profit, generated each year, divided by the value of total assets for the same period.

ROE

Net profit, generated each year, divided by the value of owners' equity for that year.

ROS

Net profit, generated each year, divided by total sales for the same period.

S**Sales**

The value of products sold over the previous twelve months, broken out by product line.

Sales Budget

This value, input on the Marketing screen, pays sales personnel and expands the distribution network.

Sale of Common Stock

Value of cash received from issuing additional stock. Maximum issue in any year is 20% of the total outstanding stock. Stock is issued at its spot price as of December 31 of the year just ended.

Second (2nd) Shift

The percentage of the production that was undertaken using Second Shift (can be up to 100% of First Shift Capacity).

SG&A

Sales, General and Administrative expenses: This figure includes all R&D and TQM costs.

Short Term Interest

Interest paid on current debt, including interest on Emergency Loans.

Stock Out

A YES on the Market Segment Analysis indicates that inventory was completely depleted. Thus, it is likely a higher sales level would have been experienced had more units been manufactured.

T**Taxes**

Taxes paid on income, using a 35% taxation rate.

Total Industry Unit Demand

The actual number of units demanded in the segment under review.

Total Fixed Assets

Value of plant and equipment less total accumulated depreciation.

Total Liabilities

Sum total of Accounts Payable, Current Debt and Long Term Debt.

Total Period Costs

Accumulation of all period costs described above.

U**Units Demanded Last Year**

Number of units demanded by customers in each market segment in the previous round.

Units in Inventory

Number of units of the product left in inventory as of December 31.

Units Sold

On the Production Analysis, the total number of a product sold into all segments.

V**Variable Costs**

Costs that vary in direct proportion to the number of units sold.

W**Working Capital**

Current Assets minus Current Liabilities.

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To Do Every Round

- Each simulated year begins on January 1. The previous year's reports reflect the industry status as of December 31 of last year.
- Launch Capstone.xls to download starting conditions.
- Analyze the *CAPSTONE® COURIER*.
- Make and upload decisions.

Understanding Market Demand

- See "FIVE MARKET SEGMENTS" on page 8 and "MARKET SIZES AND GROWTH" on page 12.

Understanding the Two Stage Purchase Decision Process

- See "THE ROUGH CUT" on page 8 and "THE FINE CUT" on page 10.

Ways to Improve Your Products

- Increase performance, decrease size.
- Increase MTBF (Mean Time Before Failure).

Ways to Increase Your Market Share

- Give the customers what they want: See "Customer Buying Criteria" on page 13.

Decisions

- Teams enter decisions in green cells.
- Yellow cells display data and are locked.
- Some green cells will turn red if an entry becomes too large.
- Any team member can upload decisions. It's up to your group to assign decision responsibilities. The website tracks the decision upload history.
- When uploading decisions you will see a message that reads "Your decisions have been uploaded." If you do not receive this message try saving your decisions again.

R&D Decisions

- Project completion times increase relative to the performance and size distances—the farther the move the longer the project.
- Each project's completion time increases as more projects are added.
- Increasing Automation on the Production screen increases a project's completion time.
- Make sure the coordinates entered fall within a segment circle. If they are outside of all segment circles they will not appeal to any customers and consequently will not sell.

Age/Perceived Age

- The terms Age and Perceived Age are used interchangeably. Changing performance and size cuts the Age of the product.
- Once a product goes into R&D, it cannot be changed again until it comes out of R&D. If a project extends longer than one year, you will not be able to start a new project for that product in the following round. The entry cells will turn yellow and remain locked until the first round after the completion date.
- New coordinates do not appear in the *CAPSTONE® COURIER* prior to the completion date—

if a project takes longer than one year the old coordinates will be published.

Product Invention

- Product invention requires four entries: a size value, a performance value, an MTBF and a name. To invent a product, enter a name in an NA cell. Make sure that the new product name starts with the first letter of your team name. Be sure to purchase production Capacity and Automation for your new product one year prior to the product's release.

Marketing Decisions

- Marketing decisions rely on Customer Buying Criteria found on the Market Segment Analyses of the *CAPSTONE® COURIER*

Price

- In each Analysis, the segment's price from the previous round appears in the Buying Criteria. The current round's range will be \$0.50 lower.
- In a Buyer's Market, where supply exceeds demand, every \$1.00 outside of the price range will drop your product's demand by 20%. At \$5.00 beyond the range there will be no demand for your product.
- In a Seller's Market, where demand exceeds supply, you can price your product up to \$4.90 beyond the price range with no fall off in demand. However, at \$5.00 beyond the range there will be no demand for your product.

Promo Budget

- The Promo Budget drives customer Awareness. Due to diminishing returns, spending more than \$3 million per product is not recommended.
- Once a product's Awareness is at 100%, you only need to spend \$1.4 million to maintain that level.
- New products are automatically charged \$250,000 for marketing rollout which delivers a base Awareness of 50%. Teams can add to this amount by entering values in the Promo Budget cell.
- If you spend nothing for Promo in a given year, you will see a decrease of 1/3 from the previous round's Awareness.

Sales Budget

- The Sales Budget drives Accessibility. Due to diminishing returns spending more than \$3 million per product is not recommended.
- The more products in a given segment the greater the effect of the combined budgets, thus increasing Accessibility for all your products in that segment.
- Products leaving a segment will leave the Accessibility level in that segment.
- 100% Accessibility is difficult to attain unless you have two products in the segment.

Your Sales Forecast

- Unit demand for each market segment can be determined by first multiplying the segment growth rate by the Total Industry Unit Demand from the previous round (found in the *CAPSTONE® COURIER*). The Growth Rates are Traditional 9.2%, Low End 11.7%, High End 16.2%, Performance 19.8% and Size 18.3%. Next, add that number to the last round's Total

Industry Unit Demand. This will give you the current round's demand for each segment.

- Dividing the current round's demand by the number of products will give you a rough idea of how many units you can sell. **HOWEVER**, you must judge your product's relative merits against your competitors' products.
- Inventory Carrying Cost is 12% of the product's cost of production.

Setting A/R Policy

- At 0 days demand is reduced to 65%. At 30 days demand is reduced to 92%. At 60 days demand is reduced to 98.5%. At 120 days there is no reduction on demand.

Setting A/P Policy

- At 30 days suppliers withhold 1% of material. At 60 days suppliers withhold 8% of material. At 90 days suppliers withhold 26% of material. At 120 days suppliers withhold 63% of material. At 150 days they refuse to deliver any material.

Production Decisions

- Products can only be produced on their own production lines— teams cannot transfer production Capacity from one product to another.
- Teams can produce up to 200% of rated Capacity by running a 2nd Shift. You cannot produce more than 200% of your rated Capacity.
- In general, production orders for each product should roughly correspond with the current round's Sales Forecast minus any inventory.
- If you buy Capacity or Automation this round it will not be available until the next round— buy it this year, use it next year.
- Selling Capacity takes effect January 1 of the current round. Selling Capacity returns \$0.65 per \$1.00 of original investment.
- New Products must have Capacity and Automation purchased a year prior to the product's release.
- Increasing Automation lowers a product's labor cost but increases R&D times.
- It rarely makes sense to lower an Automation rating. Lowering Automation incurs a retooling cost— you are paying money to make your plant less efficient.
- The Capital Budget Limit restricts capacity and automation purchases to an amount of money you could reasonably spend.

Terminating a Product

- Selling all of a product's Capacity will eliminate (discontinue) the product. Any remaining inventory will be sold to scrappers at 50% of the cost of production. Selling all but one unit of Capacity allows you to sell inventory at full price.

Finance Decisions

Cash Positions

- The Cash Position with last year's date is the same as the beginning Cash Position for the current round.

- The Cash Position as of Dec. 31 of the current round shows the projected position at the end of this round. It is taken from the Proforma Balance Sheet for the current round.
- A red number in the Cash Position cell indicates a shortfall is expected, and your team will need to turn to the capital markets described below.
- Failing to cover shortfalls will result in an Emergency Loan with an above-market interest rate.

Stock

- Stock price is a function of EPS, Book Value, and Dividend policy.
- Issuing Stock incurs a 5% Brokerage Fee.
- Retiring Stock incurs a 1.5% Brokerage Fee.

Current (Short Term) Debt

- There are no upper limits on the Short Term borrowing, however borrowing indiscriminately is not recommended.
- The Short Term interest rate is a function of your current debt level— it fluctuates from round to round.
- Current Debt due from last year is calculated into the Cash Position as of Dec. 31 of the current round (see Cash Positions above).

Bond Issues (Long Term Debt)

- Bond interest rates are 1.4% above the current round's Short Term rates.
- All bonds are 10-year notes.
- Interest rates are locked in for life of the bond (Current Debt interest rates can change from one year to the next).
- Issuing a Bond incurs a 5% brokerage fee.
- Retiring a Bond before its due date incurs a 1.5% brokerage fee, and the bond is bought back at its street value, which can exceed the face value.
- Bonds that are allowed to mature incur no brokerage fees and bought back at their face value.
- Bonds mature on December 31 of the year in their Series Number. The principle amount converts to Current Debt in the following round.

Labor Negotiations

- Check the website to see if Labor Negotiations have been scheduled.
- The first Wage offer (Starting Position) must be within 80% to 150% of current contract; your first Benefits, Profit Sharing, and Annual Raise offers (Starting Positions) must be within 0% to 150% of current levels.
- Second offers (Negotiation Ceilings) are automatically calculated to be 10% higher than the Starting Positions.

Strikes will last anywhere from 1 to 84 days. Workers will strike a week for: 1) Every \$1 your Wage Negotiating Ceiling is beneath Labor's Demand. 2) Every \$300 your Benefits Negotiating Ceiling is beneath Labor's Demand. 3) Every 1% your Profit Sharing Negotiating Ceiling is beneath Labor's Demand. 4) Every 1% your Annual Raise Negotiating Ceiling is beneath Labor's Demand.