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Login at capsim.com, click Foundation then, in the left menu, select Help > Support.
If you have problems registering, send an email to support@capsim.com.
1 Introduction

Congratulations, you are now in charge of a sensor manufacturing company. Your firm was created when the government split a monopoly into identical competitors. When the company was a monopoly, operating inefficiencies and poor product offerings were not addressed because:

- Increasing costs could be passed onto customers; and
- Mediocre products would sell because customers had no other choices.

Although last year’s financial results were decent, your products are getting old, your marketing efforts are falling short, your production lines need revamping and your financial management is almost nonexistent.

Competition in the post-monopoly era means you can no longer ignore these issues. If you do, competitors with better products and/or lower prices will take your market share.

1.1 The Industry Conditions Report

Each simulation industry is unique. The Industry Conditions Report describes, in detail, the business environment specific to your simulation, including customer buying criteria.

To view the Industry Conditions Report, log into your simulation and click the Reports link.

1.2 Management Tools

Here are the tools you need to run your company.

1.2.1 The Rehearsal Tutorial

Think of the Rehearsal Tutorial as a driving school for the simulation. The tutorial will show you ways to steer the company, including how to:

- Invent and revise products;
- Make marketing decisions;
- Schedule production and buy/sell equipment;
- Ensure your company has the financial resources it needs for the upcoming year.

The sample resources used for the Rehearsal, including its Capstone Courier and Industry Conditions Report, mirror those used in the actual simulation.

To access the Rehearsal, log in at the Capsim website and go to the Getting Started area.

1.2.2 The Capstone Courier

You and your competitors have access to the industry newspaper, the Capstone Courier. The Courier, described in Chapter 3, is a complete year-end report on the sensor industry including customer buying patterns, product positioning, manufacturing capacity and public financial information. Knowledge is power. If you have a question about your company, your customer or a competitor, start with the Capstone Courier.

The Courier’s Segment Analysis pages report Customer Survey Scores (detailed in Chapter 3) which play a large part in determining sales distributions. In general, the higher the score, the greater the sales.

The Courier displays “Last Year’s Results.” The Courier available at the start of Round 1 displays last year’s results for Round 0, when all companies were equal just after the monopoly’s breakup. The Courier available at the start of Round 2 will display the results for Round 1. As the simulation progresses and strategies are implemented, results among the competing companies will begin to vary.
Company Departments

The Rehearsal Tutorial and Chapter 4 discuss company activities. You have four main departments or functional areas:

- Research & Development, or R&D
- Marketing
- Production
- Finance

Many simulations also utilize modules such as Human Resources and TQM (Total Quality Management)/Sustainability. Modules require additional management decisions. Your simulation Dashboard will tell you if any modules are included.

Companies use the Capstone Spreadsheet to enter departmental decisions.

1.3 Company Departments

1.3.1 Research & Development (R&D)
Your R&D Department designs your product line. The department needs to invent and revise products that appeal to your customers’ changing needs.

1.3.2 Marketing
Your Marketing Department prices and promotes your products. It interacts with your customers via its sales force and distribution system. Marketing is also responsible for sales forecasts.

1.3.3 Production
Your Production Department determines how many units will be manufactured during the year. It is also responsible for buying and selling production lines.

1.3.4 Finance
Your Finance Department makes sure your company has the resources it needs to run through the year. The department can raise money via one year bank notes, 10 year bonds or stock issues. The department can also issue stock dividends, buy back stock or retire bonds before their due dates.

1.3.5 Plug-ins
Plug-ins are different than modules. Plug-ins and their decisions have a greater overall impact on your organization.

For example, the simulation might include the Corporate Responsibility and Ethics plug-in, which presents you with an unexpected ethical dilemma. Group discussion and consensus is imperative because your decisions will affect your financial results.

Your simulation Dashboard will notify you if your simulation includes a plug-in.
1.4 Inter-Department Coordination

1.4.1 R&D and Marketing
R&D works with Marketing to make sure your product line meets customer expectations.

1.4.2 R&D and Production
R&D works with Production to ensure assembly lines are purchased for new products. If Production discontinues a product, it should notify R&D.

1.4.3 Marketing and Production
Marketing works with Production to make sure manufacturing quantities are in line with forecasts. Marketing’s market growth projections also help Production determine appropriate levels of capacity. If Marketing decides to discontinue a product, it tells Production to sell the product’s production line.

1.4.4 Marketing and Finance
Marketing works with Finance to project revenues for each product and to set the Accounts Receivable policy, which is the amount of time customers can take to pay for their purchases.

1.4.5 Finance and Production
Production tells Finance if it needs money for additional equipment. If Finance cannot raise enough money, it can tell Production to scale back its requests or perhaps sell idle capacity.

1.4.6 Finance and All Departments
The Finance Department acts as a watchdog over company expenditures. Finance should review Marketing and Production decisions. Finance should crosscheck Marketing’s forecasts and pricing. Are forecasts too high or too low? Will customers be willing to pay the prices Marketing has set? Is Production manufacturing too many or too few units? Does Production need additional capacity? Has Production considered lowering labor costs by purchasing automation?

1.5 Practice and Competition Rounds
Practice Rounds allow you to organize workflow among the members of your company. You will begin to compete against the other companies in your simulation, or, if you are in a Footrace competition, against a common set of computer-run companies.

Don’t confuse the Rehearsal Tutorial with the Practice Rounds! During the Rehearsal Tutorial, you are shown how to make decisions in a scripted environment. During the Practice Rounds, you can experiment with your decisions in a competitive environment.

After the conclusion of the Practice Rounds, the simulation is reset and the real competition begins. Now it’s time to drive your company to success! Companies compete for up to eight rounds, with each round simulating one year in the life of your company.

1.5.1 Decision Audits
The Decision Audit is a complete trail of all team decisions. It will help you identify your decision-making strengths and weaknesses.

The audit is available from two locations:
- From the Capstone Spreadsheet, click Help in the menu bar; and
- On the website, log into your simulation then click the Decision Audit link.

1.6 Company Success
The board of directors, shareholders and other stakeholders expect you to make the company a market leader. Successful managers will:
- Analyze the market and its competing products;
- Create and execute a strategy; and
- Coordinate company activities.

Best of luck in running a profitable and sustainable company!

2 Industry Conditions

The information reported in your Industry Conditions Report will help you understand your customers.

Your customers fall into different groups which are represented by market segments. A market segment is a group of customers that has similar needs. The segments are named for the customer’s primary requirements such as:
- Traditional
- Low End
- High End
- Performance
- Size

The Industry Conditions Report lists market segment sales percentages and projected growth rates unique to your simulation.

The Industry Conditions Report is available from the website. Log into your simulation then click the Reports link.

2.1 Buying Criteria
Customers within each market segment employ different standards as they evaluate products. They consider four buying criteria: Price, Age, MTBF (Mean Time Before Failure) and Positioning.
Buying Criteria

2.1.1 Price
Each segment has different price expectations. One segment might want inexpensive products while another, seeking advanced technology, might be willing to pay higher prices.

2.1.2 Age
Each segment has different age expectations, that is, the length of time since the product was invented or revised. One segment might want brand new technology while another might prefer proven technology that has been in the market for a few years.

2.1.3 MTBF (Mean Time Before Failure) or Reliability
MTBF (Mean Time Before Failure) is a rating of reliability measured in hours. Segments have different MTBF criteria. Some might prefer higher MTBF ratings while others are satisfied with lower ratings.

2.1.4 Positioning
Sensors vary in their dimensions (size) and the speed/sensitivity with which they respond to changes in physical conditions (performance). Combining size and performance creates a product attribute called positioning.

The Perceptual Map
Positioning is such an important concept that marketers developed a tool to track the position of their products and those of their competitors. This tool is called a Perceptual Map.

Note the Perceptual Map in Figure 2.1. You will see this map quite often through the course of the simulation.

The map measures size on the vertical axis and performance on the horizontal axis. Each axis extends from 0 to 20 units. The arrow in Figure 2.1 points to a product called Able with a performance measurement of 8.0 and a size of 12.0.

2.1.5 Market Segment Positions on the Perceptual Map
Customers within each market segment have different positioning preferences. For example, a segment might be satisfied with inexpensive products that are slow performing and large in size. That segment would want products that fall inside the upper left set of dashed and solid circles in Figure 2.2. A segment that wants products that are fast performing and small in size would want products that fall within the lower right set of dashed and solid circles.

Over time, your customers expect products that are smaller and faster. This causes the segments to move or drift a little each month. As the years progress the locations of the circles significantly change. The example in Figure 2.3 shows the location of the market segments at the end of the fourth year. Figure 2.4 shows the segments at the end of the eighth year.

Example!
See your Industry Conditions Report for exact segment locations.

Figure 2.1 The Perceptual Map Used in the Simulation: The Perceptual Map plots product size and performance characteristics.

Figure 2.2 Beginning Segment Positions: At the beginning of the simulation, segment positions are clustered in the upper left portion of the perceptual map.

Figure 2.3 Segment Positions at the End of Year 4: The overlap between the segments decreases because the Low End and Traditional segments move at slower speeds.

Figure 2.4 Segment Positions at the End of Year 8: The segments have moved to the lower right; very little overlap remains.
Each year, some market segments demand greater improvement than others. Therefore segments drift at different rates. Segments demanding greater improvement will move faster and farther than others. As time goes by, the overlap between the segments diminishes.

Drift rates are published in the Industry Conditions Report.

Market segments will not move faster to catch up with products that are better than customer expectations. Customers will refuse to buy a product positioned outside the circles. Customers are only interested in products that satisfy their needs. This includes being within the circles on the Perceptual Map!

Perceptual Maps Can Be Used for Many Types of Products...

Perceptual Maps can be used to plot any two product characteristics. For example, cereal manufacturers could plot nutrition and taste. The dots in the figure below represent sales of breakfast cereals based on ratings of taste and nutrition. There are few sales in the lower left corner—not many consumers want products that have poor taste and poor nutrition.

As they review product sales, marketers would notice three distinct clusters. The cluster to the upper left indicates a group of customers that is more interested in nutrition than taste. The cluster to the lower right indicates a group that is more interested in taste than nutrition. The cluster to the upper right indicates a group that wants both good taste and good nutrition.

The clusters, or market segments, could then be named “Taste,” “Nutrition” and “Taste/Nutrition.” The simulation uses a similar positioning method to name its market segments.

In the simulation, there are zero customers interested in products positioned outside of the dashed circles.

Your R&D and Marketing Departments have to make sure your products keep up with changing customer preferences. To do this, R&D must reposition products, keeping them within the moving segment circles. See “4.1 Research & Development (R&D)” for more information.

2.2 Buying Criteria by Segment

Buyers in each segment place a different emphasis upon the four buying criteria. For example, some customers are more interested in price, while others are more interested in positioning.

Positioning and price criteria change every year. Age and MTBF criteria always remain the same.

Buying Criteria for the previous year are reported in the Capstone Courier’s Segment Analysis pages. As you take over the company to make decisions for Round 1, your reports reflect customer expectations as of December 31, Round 0 (yesterday). The Industry Conditions Report displays the Round 0 buying criteria for each market segment. Here are two example segments.

Example 1 customers seek proven products at a modest price.

- Age, 2 years—importance: 47%
- Price, $20.00-$30.00—importance: 23%
- Ideal Position, performance 5.0 size 15.0—importance: 21%
- MTBF, 14,000-19,000—importance: 9%

Example 2 customers seek cutting-edge technology in size/performance and new designs.

- Ideal Position, performance 8.9 size 11.1—importance: 43%
- Age, 0 years—importance: 29%
- MTBF, 20,000-25,000—importance: 19%
- Price, $30.00-$40.00—importance: 9%

3 The Customer Survey Score

In any month, a product’s demand is driven by its monthly customer survey score. Assuming it does not run out of inventory, a product with a higher score will outsell a product with a lower score.
Customer survey scores are calculated 12 times a year. The December customer survey scores are reported in the Capstone Courier’s Segment Analysis pages.

A customer survey score reflects how well a product meets its segment’s buying criteria. Company promotion, sales and accounts receivable policies also affect the survey score.

Scores are calculated once each month because a product’s age and positioning change a little each month. If during the year a product is revised by Research and Development, the product’s age, positioning and MTBF characteristics can change quite a bit. As a result, it is possible for a product with a very good December customer survey score to have had a much poorer score – and therefore poorer sales – in the months prior to an R&D revision.

Prices, set by Marketing at the beginning of the year, will not change during the year.

### 3.1 Buying Criteria and the Customer Survey Score

The customer survey starts by evaluating each product against the buying criteria. Next, these assessments are weighted by the criteria’s level of importance. For example, some segments assign a higher importance to positioning than others. A well-positioned product in a segment where positioning is important will have a greater overall impact on its survey score than a well-positioned product in a segment where positioning is not important.

The Industry Conditions Report and the Courier’s Market Segment Analysis pages break down each segment’s criteria in order of importance.

A perfect customer survey score of 100 requires that the product: Be positioned at the ideal spot (the segment drifts each month, so this can occur only one month per year); be priced at the bottom of the expected range; have the ideal age for that segment (unless they are revised, products grow older each month, so this can occur only one month per year); and have an MTBF specification at the top of the expected range.

Your customers want perfection, but it is impractical to have “perfect” products. In many cases you will have to settle for “great” products, but the better the products, the higher the costs. Your task is to give customers great products while still making a profit. Your competitors face the same dilemma.

#### 3.1.1 Positioning Score

Marketers must understand both what customers want and their boundaries. In terms of a product’s size and performance (as discussed in Section 2.1.5), the Perceptual Map illustrates these ideas with circles. Each segment is described with a dashed outer circle, a solid inner circle and a dot we call the ideal spot.

**Rough Cut Circle**

The dashed outer circle defines the outer limit of the segment. Customers are saying, “I will NOT purchase a product outside this boundary.” We call the dashed circle the rough cut because any product outside of it “fails the rough cut” and is dropped from consideration. Rough cut circles have a radius of 4.0 units.

**Fine Cut Circle**

The solid inner circle defines the heart of the segment. Customers prefer products within this circle. We call the inner circle the fine cut because products within it “make the fine cut.” Fine cut circles have a radius of 2.5 units.

**Ideal Spot**

The ideal spot is that point in the heart of the segment where, all other things being equal, demand is highest.

**Segment Movement**

Each segment moves across the Perceptual Map a little each month. In a perfect world your product would be positioned in front of the ideal spot in January, on top of the ideal spot in June and trail the

---

**Figure 3.1** Positioning Scores: The outer edge of the orange rough cut measures 4.0 units from the center of the circle; the edge of the green fine cut measures 2.5 units from the center. Segment ideal spots are represented by the black dots.

The example on the left displays a positioning score for a segment that prefers products with slower performance and larger size. The example on the right displays a score for a segment that demands cutting edge products with high performance and small size. The orange areas represent the segment rough cuts, where scores rapidly decrease towards zero.
ideal spot in December. In December it would complete an R&D project to jump in front of the ideal spot for next year.

**Positioning Rough Cut**

Products inside the rough cut but outside of the fine cut (orange areas, Figure 3.1) are badly positioned. They are between 2.5 and 4.0 units from the center of the circle. Customers will consider them but they are at a significant disadvantage to products inside the fine cut.

Specifically, products in the rough cut have reduced customer survey scores. Their score drops in a linear fashion. Just beyond the fine cut the score drops 1%. Halfway between the fine and rough cut the score drops 50%. The customer survey score drops 99% for products that are just inside the rough cut.

Sensors that are about to enter the rough cut can be revised by Research & Development (see “4.1.1 Changing Performance, Size and MTBF”).

The location of each segment’s rough cut and fine cut circles as of December 31 of the previous year appears on page 11 of the Courier.

**Positioning Fine Cut**

Products inside the fine cut (green areas, Figure 3.1) are within 2.5 units of the center of the circle. Ideal spots for each segment are illustrated by the black dots. The example on the left illustrates a segment that prefers proven, inexpensive technology. The ideal spot is to the upper left of the segment center, where material costs are lower. The example on the right illustrates a segment that prefers cutting-edge technology. The ideal spot is to the lower right of the segment center, where material costs are higher (see Figure 4.1 for an illustration of material positioning costs).

A product’s positioning score changes each month because segments and ideal spots drift a little each month. Placing a product in the path of the ideal spot will return the greatest benefit though the course of a year.

**3.1.2 Price Score**

Every segment has a $10.00 price range. Price ranges in all segments drop $0.50 per year.

Segment price expectations correlate with the segment’s position on the Perceptual Map. Segments that demand higher performance and smaller sizes are willing to pay higher prices.

**Price Rough Cut**

Sensors priced $5.00 above or below the segment guidelines will not be considered for purchase. Those products fail the price rough cut.

Sensors priced $1.00 above or below the segment guidelines lose about 20% of their customer survey score (orange lines, Figure 3.2). Sensors continue to lose approximately 20% of their customer survey score for each dollar above or below the guideline, on up to $4.99, where the score is reduced by approximately 99%. At $5.00 outside the range, demand for the product is zero.

**Price Fine Cut**

Within each segment’s price range, price scores follow a classic economic demand curve (green curve, Figure 3.2): As price goes down, the price score goes up.

**3.1.3 MTBF Score**

Each segment sets a 5,000 hour range for MTBF (Mean Time Before Failure), the number of hours a product is expected to operate before it malfunctions.

**MTBF Rough Cut**

Demand scores fall rapidly for products with MTBFs beneath the segment’s guidelines. Products with an MTBF 1,000 hours below the
Estimating the Customer Survey Score

Segment guideline lose 20% of their customer survey score. Products continue to lose approximately 20% of their customer survey score for every 1,000 hours below the guideline, down to 4,999 hours, where the customer survey score is reduced by approximately 99%. At 5,000 hours below the range, demand for the product falls to zero.

MTBF Fine Cut

Within the segment’s MTBF range, the customer survey score improves as MTBF increases (Figure 3.3). However, material costs increase $0.30 for every additional 1000 hours of reliability. Customers ignore reliability above the expected range—demand plateaus at the top of the range.

3.1.4 Age Score

The age criteria does not have a rough cut; a product will never be too young or too old to be considered for purchase.

Customers demanding cutting-edge technology prefer newer products. The ideal ages for these market segments are generally one and a half years or less. Other segments prefer proven technology. These segments seek older designs.

Each month, customers assess a product’s age and award a score based upon their preferences. Examples of age preferences are illustrated in Figure 3.4.

### Example!

See your Industry Conditions Report for exact information.

![Figure 3.4 Age Scores: The example on the left displays an age score for a segment that prefers products that have an age of one year. The example on the right displays a score for a segment that prefers products that are two years old.](image)

Age preferences for each segment are published in the Industry Conditions Report and the Segment Analysis pages of the Capstone Courier.

3.2 Estimating the Customer Survey Score

The customer survey score drives demand for your product in a segment. Your demand in any given month is your score divided by the sum of the scores. For example, if your product’s score in April is 20 and your competitors’ scores are 27, 19, 21 and 3, then your product’s April demand is:

\[
\frac{20}{20+27+19+21+3} = 22\%
\]

Assuming you had enough inventory to meet demand, you would receive 22% of segment sales for April.

What generates the score itself? Marketers speak of “the 4 P’s” — price, product, promotion and place. Price and product are found in the buying criteria. Together they present a price-value relationship. Your promotion budget builds “awareness,” the number of customers who know about your product before sourcing. Your sales budget (place) builds “accessibility,” the ease with which customers can work with you after they begin sourcing. To the 4 P’s we can add two additional elements—credit terms and availability. Credit terms are expressed by your accounts receivable (A/R) policy. Availability addresses inventory shortages.

3.2.1 Base Scores

To estimate the customer survey score, begin with the buying criteria available in the Courier’s Segment Analysis reports. For example, suppose the buying criteria are:

- Age, 2 years—importance: 47%
- Price, $20.00-$30.00—importance: 23%
- Ideal Position, performance 5.0 size 15.0—importance: 21%
- MTBF, 14,000-19,000—importance: 9%

A perfect score of 100 requires that the product have an age of 2.0 years, a price of $20.00, a position at the ideal spot (5.0 and 15.0) and an MTBF of 19,000 hours.

The segment weighs the criteria at: Age 47%, Price 23%, Positioning 21% and MTBF 9%. You can convert these percentages into points then use these numbers to estimate a base score for your product. For example, price is worth 23 points. The perfect Round 0 price of $20.00 would get 23 points, but at the opposite end of the price range, a price of $30.00 would only get one point.

You can use the age and positioning charts in your Industry Conditions Report to estimate average points for those criteria.

However, the base score can fall because of poor awareness (promotion), accessibility (place) or the credit terms you extend to your customers.

3.2.2 Accounts Receivable

A company’s accounts receivable policy sets the amount of time customers have to pay for their purchases. At 90 days there is no reduction to the base score. At 60 days the score is reduced 0.7%. At 30 days the score is reduced 7%. Offering no credit terms (0 days) reduces the score by 40% (see “4.4.5 Credit Policy”).

Example conditions and charts are published in your Industry Conditions Report. For example, suppose your product has an ideal MTBF of 19,000 hours. Your customers want it within 30% of the guideline MTBF, or 14,000-19,000. Each month you measure MTBF and any MTBF below guideline decreases your customer survey score.

Within the segment’s MTBF range, the customer survey score improves as MTBF increases (Figure 3.3). However, material costs increase $0.30 for every additional 1000 hours of reliability. Customers ignore reliability above the expected range—demand plateaus at the top of the range.

### Example!

See your Industry Conditions Report for exact information.

...
3.2.3 Awareness and Accessibility
After your product leaves the factory and enters the marketplace, the calculations for its score become less exact. The score will be affected by the level of the product’s awareness (the percentage of people who know about your product) and its segment’s accessibility (the number of customers who can easily interact with your company).

Awareness is built over time by the product’s promotion budget. Promotion budgets fund advertising and public relations campaigns.

Accessibility is built over time by the product’s sales budget. Sales budgets fund salespeople and distribution systems to service customers within the product’s market segment.

Similar products with higher awareness and accessibility will score better than those with lower percentages (see “4.2 Marketing” for more information on awareness and accessibility).

If the TQM/Sustainability module is enabled, some initiatives can increase the customer survey score (see “7.1 TQM/Sustainability”).

3.3 Stock Outs and Seller’s Market
What happens when a product generates high demand but runs out of inventory (stocks out)? The company loses sales as customers turn to its competitors. This can happen in any month.


Usually, a product with a low customer survey score has low sales. However, if a segment’s demand exceeds the supply of products available for sale, a seller’s market emerges. In a seller’s market, customers will accept low scoring products as long as they fall within the segment’s rough cut limits. For example, desperate customers within the product’s market segment.

Consider the question, “What happens to price if every competitor has just enough capacity to meet demand from its customers?”

4. Managing Your Company
It’s time to unlock the doors and turn on the lights. Welcome to your company. The Rehearsal Tutorial (described in Section 1.2.1) shows you the mechanics of the company departments described below. Remember, entering decisions is the easy part, determining what decisions to enter requires some thought. This chapter and the Rehearsal Tutorial will help you get started.

Every company starts the simulation with five products. Your company has one product for each segment. You have one assembly line per product. Products can be terminated or added. Your company must have at least one product and cannot have more than eight. Your decisions, made every year on January 1, are carried out by your employees throughout the year.

Your simulation might also include additional modules and plug-ins. Your simulation Dashboard will notify you if these decisions are scheduled.
4.1 Research & Development (R&D)

The Research and Development (R&D) department oversees invention and redesign. It develops the innovations needed to keep the company ahead of the competition. R&D is responsible for the “product” portion of the 4 P’s of Marketing (“product, price, place and promotion”). This makes R&D an essential part of any marketing process.

Your 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 towards the lower right on the map (see “2.1.4 Positioning”).

Your R&D decisions are fundamental to your Marketing and Production plans. In Marketing, R&D addresses:

- The positioning 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 (MTBF rating) of each product

In Production, R&D affects or is affected by:

- The cost of material
- The purchase of new facilities to build new products
- Automation levels (The higher the automation level, the longer it takes to complete an R&D project.)

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 by December 31 of last year, you will not be able to launch a new project for that product (the decision entry cells in the R&D area of the Capstone Spreadsheet will be locked).

4.1.1 Changing Performance, Size and MTBF

A repositioning project moves an existing product from one location on the Perceptual Map to a new location, generally (but not always) down and to the right. Repositioning requires a new size attribute and/or a new performance attribute. To keep up with segment drift, a product must be made smaller (that is, decrease its size) and better performing (that is, increase its performance).

Positioning Costs

Positioning affects material costs (Figure 4.1). The more advanced the positioning, the higher the cost. At the beginning of the simulation, the trailing edge of the Low End fine cut has the lowest positioning cost of approximately $1.00; the leading edge of the High End fine cut has the highest positioning cost of approximately $10.00.

Reliability (MTBF) Costs

The reliability rating, or MTBF, for existing products can be adjusted up or down. Each 1,000 hours of reliability (MTBF) adds $0.30 to the material cost. A product with 20,000 hours reliability includes $6.00 in reliability costs:

$$ \frac{0.30 \times 20,000}{1,000} = 6.00 $$

Improving positioning and reliability will make a product more appealing to customers, but doing so increases material costs.

Inventing Sensors

New products are assigned a name (click in the first cell that reads NA in the name column), performance, size and MTBF. Of course, these specifications should conform to the criteria of the intended market segment. The name of all new products must have the same first letter of the company name.

The Production Department must order production capacity to build the new product one year in advance. Invention projects take at least one year to complete.

![Figure 4.1](image.png)
All new products require capacity and automation, which should be purchased by the Production Department in the year prior to the product’s revision (release) date. If you don’t buy the assembly line the year prior to its introduction, you cannot manufacture your new product!

It is not possible to produce new products prior to the revision date. A new product with a revision date of July 1 will be produced in the second half of the year. The capacity and automation will stand idle for the first half of the year.

4.1.2 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. Generally, the longer the move on the Perceptual Map, the longer it takes the R&D Department to complete the project.

Project lengths can be as short as three months or as long as three years. Project lengths will increase when the company puts two or more products into R&D at the same time. When this happens each R&D project takes longer. Assembly line automation levels also affect project lengths. R&D project costs are driven by the amount of time they take to complete. A six-month project costs $500,000; a one-year project costs $1,000,000.

Sensors will continue to produce and sell at the old performance, size and MTBF specifications up until the day the project completes, shown on the spreadsheet as the revision date. Unsold units built prior to the revision date are reworked free of charge to match the new specifications.

If the project length takes more than a year, the revision date will be reported in the next Capstone Courier. However, the new performance, size and MTBF will not appear; old product attributes are reported prior to project completion.

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. If the module is active, TQM/Sustainability investments can also decrease R&D times (see “7.1 TQM/Sustainability”). It is important to verify completion dates after all decisions have been entered. 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 year and the second ending halfway through the following year.

4.1.3 A Sensor’s Age

It is possible for a product to go from an age of 4 years to 2 years. How can that be? When a product is moved on the Perceptual Map, customers perceive the repositioned product as newer and improved, but not brand new. As a compromise, customers cut the age in half. If the product’s age is 4 years old, on the day it is repositioned, its age becomes 2 years old. Therefore, you can manage the age of a product by repositioning the product. It does not matter how far the product moves. Aging commences from the revision date.

Changing MTBF alone will not affect a product’s age.

Age criteria vary from segment to segment. For example, if a segment prefers an age of two years and the product’s age approaches 3 years, customers will lose interest (see Figure 3.4). Repositioning the product drops the age from 3 to 1.5 years and customers will become interested again.

Log into the Capstone Spreadsheet and click the Decisions menu. Select Research & Development. To change a product’s performance, enter a number in the New Pfmm cell; to change its size, enter a number in the New Size cell. To change the reliability rating, enter a number in the MTBF cell. As you vary the specifications, observe the effect upon the revision date, project cost, material cost and age.

The Rehearsal Tutorial’s R&D Tactics show you how to run the department. Log in at the Capsim website and go to Getting Started for information about the Rehearsal.

4.2 Marketing

Marketing functions vary widely depending on the industry and company. In general, the department drums up interest in the company’s products or services through a mix of activities. These can include advertising, public relations and good old fashioned salesmanship.

Your Marketing Department is concerned with the remaining P’s (beyond R&D’s product): Price, place and promotion. Your Marketing Department is also in charge of sales forecasting.

4.2.1 Pricing Sensors

Price was discussed in 3.1.2. To review, appeal falls to zero when prices go $5.00 above or below the expected price range. Price drives the product’s contribution to profit margin. Dropping the price increases appeal but reduces profit per unit.

Segment price ranges fall at a rate of $0.50 per year. For example, if in Round 0, Traditional customers expect a price between $20.00 and $30.00, then in Round 1, the Traditional price range will be $19.50-$29.50; Round 2, $19.00-$29.00, etc. This puts pressure on companies to improve their cost structures.
4.2.2 Promotion and Sales Budgets
Promotion and sales budgets affect product appeal. See “3.2 Estimating the Customer Survey Score” for more information.

Promotion
Each product’s promotion budget determines its level of awareness. A product’s awareness percentage reflects the number of customers who know about the product. An awareness of 50% indicates half of the potential customers know it exists. From one year to the next, a third (33%) of those who knew about a product forget about it.

Last Year’s Awareness - (33% * Last Year’s Awareness) = Starting Awareness

If a product ended last year with an awareness of 50%, this year it will start with an awareness of approximately 33%. This year’s promotion budget would build from a starting awareness of approximately 33%.

Starting Awareness + Additional Awareness From Figure 4.2 = New Awareness

Figure 4.2 indicates a $1,500,000 promotion budget would add 36% to the starting awareness, for a total awareness of 69% (33 + 36 = 69).

Figure 4.2 indicates a $3,000,000 budget would add just under 50% to the starting awareness, roughly 14% more than the $1,500,000 expenditure (33 + 50 = 83). This is because further expenditures tend to reach customers who already know about the product. Once your product achieves 100% awareness, you can scale back the product’s promotion budget to around $1,400,000. This will maintain 100% awareness year after year.

Sales
Each product’s sales budget contributes to segment accessibility. A segment’s accessibility percentage indicates the number of customers who can easily interact with your company via salespeople, customer support, delivery, etc. Like awareness, if your sales budgets drop to zero, you lose one third of your accessibility each year. Unlike awareness, accessibility applies to the segment, not the product. If your product exits a segment, it leaves the old accessibility behind. When it enters a different segment, it gets that segment’s accessibility.

If you have two or more products that meet a segment’s fine cut criteria, the sales budget for each product contributes to that segment’s accessibility. The more products you have in the segment’s fine cut, the stronger your distribution channels, support systems, etc. This is because each product’s sales budget contributes to the segment’s accessibility.

If you have one product in a segment, there is no additional benefit to spending more than $3,000,000. If you have two or more products in a segment, there is no additional benefit to spending more than a $4,500,000 split between the products, for example, two products with sales budgets of $2,250,000 each (see Figure 4.3).

Sales budgets are less effective when products are not completely positioned in the fine cut circle, when prices rise above segment guidelines or when MTBFs fall below segment guidelines.

The Courier’s Segment Analysis reports (pages 5-9) publish awareness.

New products are newsworthy events. The buzz creates 25% awareness at no cost. The 25% is added to any additional awareness you create with your promotion budget.
Achieving 100% accessibility is difficult. You must have two or more products in the segment’s fine cut. Once 100% is reached, you can scale back the combined budgets to around $3,500,000 to maintain 100%.

The Courier’s Segment Analysis reports (pages 5-9) publish accessibility.

**Awareness and Accessibility**

Think of awareness and accessibility as “before” and “after” the sale. The promotion 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 promotion budget is spent on advertising and public relations. The sales budget is spent on distribution, order entry, customer service, etc. Awareness and accessibility go hand and hand in making the sale. The former is about encouraging the customer to choose your product; the latter is about closing the deal via your salespeople and distribution channels.

**4.2.3 Sales Forecasting**

Accurate sales forecasting is a key element to company success. Manufacturing too many units results in higher inventory carrying costs. Manufacturing too few units results in stock outs and lost sales opportunities, which can cost even more (see “10 Forecasting”).

Log into the Capstone Spreadsheet and click the Decisions menu. Select Marketing. Use this area to determine each product’s Price, Promotion Budget, Sales Budget and Sales Forecast. What’s the difference between the Computer Prediction and Your Sales Forecast? The Computer Prediction cannot consider what your competitors are actually doing. It does not know. Instead, it assumes each of your competitors will offer one mediocre product (with a customer survey score of 20) in each segment. It benchmarks how your product would do against this mediocre playing field.

The Computer Prediction, expressed as units demanded, changes as you make decisions about your product.

You use the Computer Prediction to evaluate the impact your decisions will have upon your product’s appeal. For example, you can estimate the impact a price change will have upon demand. The Your Sales Forecast column overrides the Computer Prediction with your own prediction (see “10 Forecasting”). Until you provide a sales forecast, the computer uses its mediocre Computer Prediction to predict your proforma financial statements. Always override the Computer Prediction with your own forecast.

The remaining cells display the financial impacts of your decisions:

- Gross Revenue Forecast (Price multiplied by either the Computer Prediction or, if entered, Your Sales Forecast.)
- Variable Costs (Labor, Material and Inventory Carrying costs subtracted from the Gross Revenue Forecast.)
- Contribution Margin Forecast (Gross Revenue minus variable costs.)
- Less Promotion and Sales (Contribution Margin Forecast minus the product’s Promotion Budget and Sales Budget.)

The Rehearsal Tutorial’s Marketing Tactics show you how to run the department. Log in at the Capsim website and go to Getting Started for information about the Rehearsal.

**4.3 Production**

For manufacturers, production literally puts everything together. The department coordinates and plans manufacturing runs, making sure that products get out the door.

In your Production Department, each product has its own assembly line. You cannot move a product from one line to another because automation levels vary and each product requires special tooling.

As it determines the number of units to produce for the upcoming year, Production needs to consider the sales forecasts developed by Marketing minus any inventory left unsold from the previous year.

**4.3.1 Capacity**

First shift capacity is defined as the number of units that can be produced on an assembly line in a single year with a daily eight hour shift. An assembly line can produce up to twice its first shift capacity with a second shift. An assembly line with a capacity of 2,000,000 units per year could produce 4,000,000 units with a second shift. However, second shift labor costs are 50% higher than the first shift.

Each new unit of capacity costs $6.00 for the floor space plus $4.00 multiplied by the automation rating. The Production spreadsheet will calculate the cost and display it for you. Increases in capacity require a full year to take effect— increase it this year, use it next year.

Capacity can be sold at the beginning of the year for $0.65 on the dollar value of the original investment. You can replace the capacity in later years, 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 “6.3 Income Statement”).
Production

The dollar value limit of capacity and automation purchases is largely determined by the maximum amount of capital that can be raised through stock and bond issues plus excess working capital (see “4.4 Finance”).

4.3.2 Discontinuing A Sensor

If you sell all the capacity on an assembly line, Capstone interprets this as a liquidation instruction and will sell your remaining inventory for half the average cost of production. Capstone writes off the loss on your income statement. If you want to sell your inventory at full price, sell all but one unit of capacity.

4.3.3 Automation

As automation levels increase, the number of labor hours required to produce each unit falls. The lowest automation rating is 1.0; the highest rating is 10.0.

At an automation rating of 1.0, labor costs are highest. Each additional point of automation decreases labor costs approximately 10%. 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.

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

1. Automation is expensive. At $4.00 per point of automation, raising automation from 1.0 to 10.0 costs $36.00 per unit of capacity;
2. As you raise automation, it becomes increasingly difficult for R&D to reposition products short distances on the Perceptual Map. For example, a project that moves a product 1.0 on the map takes significantly longer at an automation level of 8.0 than at 5.0 (Figure 4.4). Long moves are less affected. You can move a product a long distance at any automation level, but the project will take between 2.5 and 3.0 years to complete.

Changing Automation

For each point of change in automation, up or down, the company is charged $4.00 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 $4,000,000.

Reducing automation costs money. If you reduce automation, you will be billed for a retooling cost. The net result is you will be spending 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.

When you buy automation, you might want to determine the return on investment (ROI). On your income statement, find last year’s labor cost for the product you are automating. Your labor cost savings will be approximately 10% for each new point of automation. Multiply the savings by the number of rounds remaining in your simulation then divide it by the total cost of the automation.

\[
\text{(Savings \times Remaining Rounds) / Automation Cost} = \text{ROI}
\]

If your plant is highly utilized your ROI will be higher than if your plant is only partially utilized (if your plant is under-utilized you might consider selling excess capacity).

Clearly, the greater the ROI, the better the investment.

Changes in automation require a full year to take effect—change it this year, use it next year.

Log into the Capstone Spreadsheet and click the Decisions menu. Select Production. Use this area to enter for each product:

- A Production Schedule
- Increases in first shift capacity (Put a positive number in Buy/Sell Capacity.)
- Decreases in first shift capacity (Put a negative number in Buy/Sell Capacity.)
- Changes in automation level (Enter a number in New Automation Rating.)

The Rehearsal Tutorial’s Production Tactics show you how to run the department. Log in at the Capsim website and go to Getting Started for information about the Rehearsal.
4.4 Finance

Corporate finance functions differ from company to company. Duties can include managing financial risk, determining borrowing levels or even simple check writing. In general, the department monitors the company’s flow of money, the life blood of any business.

Your Finance Department is primarily concerned with five issues:

1. Acquiring the capital needed to expand assets, particularly plant and equipment. Capital can be acquired through:
   - Current Debt
   - Stock Issues
   - Bond Issues (Long Term Debt)
   - Profits

2. Establishing a dividend policy that maximizes the return to shareholders.

3. Setting accounts payable policy (which can also be entered in the Production and Marketing areas) and accounts receivable policy (which can also be entered in the Marketing area).


5. Selecting and monitoring performance measures that support your strategy.

Finance decisions should be made after all other departments enter their decisions. After the management team decides what resources the company needs, the Finance Department addresses funding issues and financial structure.

One of the Finance Department’s fiduciary duties is to verify that sales forecasts and prices are realistic. Unrealistic prices and forecasts will predict unrealistic cash flows in the proformas. Finance can determine a range of possible outcomes for the year by changing (but not saving) Marketing’s forecasts then rechecking the proformas. Lowering forecasts decreases revenue and increases inventory (worst case); raising forecasts increases revenue and decreases inventory (best case).

Finance can print the worst case and best case proformas, then compare them to next year’s annual reports.

4.4.1 Current Debt

Your bank issues current debt in one year notes. The Finance area in the Capstone Spreadsheet displays the amount of current debt due from the previous year. Last year’s current debt is always paid off on January 1. The company can “roll” that debt by simply borrowing the same amount again. There are no brokerage fees for current debt.

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 and the higher the current debt rates.

As a general rule, companies fund short term assets like accounts receivable and inventory with current debt offered by banks.

Bankers will loan current debt up to about 75% of your accounts receivable (found on last year’s balance sheet) and 50% of this year’s inventory. They estimate your inventory for the upcoming year by examining last year’s income statement. Bankers assume your worst case scenario will leave a three to four month inventory and they will loan you up to 50% of that amount. This works out to be about 15% of the combined value of last year’s total direct labor and total direct material, which display on the income statement.

Bankers also realize your company is growing, so as a final step bankers increase your borrowing limit by 20% to provide you with room for expansion in inventory and accounts receivable.

4.4.2 Bonds

All bonds are ten year notes. Your company pays a 5% brokerage fee for issuing bonds. The first three digits of the bond, the series number, reflect the interest rate. The last four digits indicate the year in which the bond is due. The numbers are separated by the letter S which stands for “series.” For example, a bond with the number 12.6S2014 has an interest rate of 12.6% and is due December 31, 2014.

As a general rule, bond issues are used to fund long term investments in capacity and automation.

Bondholders will lend total amounts up to 80% of the value of your plant and equipment (the Production Department’s capacity and automation). Each bond issue pays a coupon, the annual interest payment, to investors. If the face amount or principal of bond 12.6S2014 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. Each year your company is given a credit rating that ranges from AAA (best) to D (worst). In Capstone, ratings are evaluated by comparing current debt interest rates with the prime rate.

When issuing new bonds, the interest rate will be 1.4% over the current debt interest rates. If your current debt interest rate is 12.1%, then the bond rate will be 13.5%.

You can buy back outstanding bonds before their due date. A 1.5% brokerage fee applies. These bonds are repurchased at their market value or street price on January 1 of the current year. 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.

If you buy back bonds with a street price that is less than its face amount, you make a gain on the repurchase. This will be reflected as a negative write-off on the income statement (see “6.3 Income Statement”).
Finance

Bonds are retired in the order they were issued. The oldest bonds retire first. There are no brokerage fees for bonds that are allowed to mature to their due date.

If a bond remains on December 31 of the year it becomes due, your banker lends you current debt to pay off the bond principal. This, in effect, converts the bond to current debt. This amount is combined with any other current debt due at the beginning of the next year.

**When Bonds Are Retired Early**
A bond with a face amount of $10,000,000 could cost $11,000,000 to repurchase because of fluctuations in interest rates and your credit worthiness. A 1.5% brokerage fee applies. The difference between the face value and the repurchase price will reflect as a gain or loss in the income statement’s fees and write-offs.

**When Bonds Come Due**
Assume the face amount of bond 12.6S2014 is $1,000,000. The $1,000,000 repayment is acknowledged in your reports and spreadsheets in the following manner: Your annual reports from December 31, 2014 would reflect an increase in current debt of $1,000,000 offset by a decrease in long term debt of $1,000,000. The 2014 spreadsheet will list the bond because you are making decisions on January 1, 2014, when the bond still exists. Your 2015 spreadsheet would show a $1,000,000 increase in current debt and the bond no longer appears.

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

**4.4.4 Emergency Loans**

Emergency loans are combined with any current debt from last year. The total amount displays in the Due This Year cell under Current Debt.

Emergency loans depress stock prices, even when you are profitable. Stockholders take a dim view of your performance when they witness a liquidity crisis.

The dividend is the amount of money paid per share to stockholders each year. Stockholders do not respond to dividends beyond the EPS; they consider them unsustainable. For example, if your EPS is $1.50 per share and your dividend is $2.00 per share, stockholders would ignore anything above $1.50 per share as a driver of stock price. In general, dividends have little effect upon stock price. However, Capstone is unlike the real world in one important aspect—there are no external investment opportunities. If you cannot use profits to grow the company, idle assets will accumulate. Capstone is designed such that in later rounds your company is likely to become a cash cow, spinning off excess cash. How you manage that spin off is an important consideration in the end game and dividends are an important tool at your disposal.

You can retire stock. The amount cannot exceed the lesser of either:

- 5% of your outstanding shares, listed on page 2 of last year’s Courier; or
- Your total equity listed on page 3 of last year’s Courier.

You are charged a 1.5% brokerage fee to retire stock.

**4.4.3 Stock**

Stock issue transactions take place at the current market price. Your company pays a 5% brokerage fee for issuing stock. New stock issues are limited to 20% of your company’s outstanding shares in that year.

Stock price is driven by book value, the last two years’ earnings per share (EPS) and the last two years’ annual dividend.

Book value is equity divided by shares outstanding. Equity equals the common stock and retained earnings values listed on the balance sheet. Shares outstanding is the number of shares that have been issued. For example, if equity is $50,000,000 and there are 2,000,000 shares outstanding, book value is $25.00 per share.

EPS is calculated by dividing net profit by shares outstanding.

As a general rule, stock issues are used to fund long term investments in capacity and automation.
4.4.5 Credit Policy

Your company determines the number of days between transactions and payments. For example, your company could give customers 30 days to pay their bills (accounts receivable) while holding up payment to suppliers for 60 days (accounts payable).

Shortening A/R (accounts receivable) lag from 30 to 15 days in effect recovers a loan made to customers. Similarly, extending the A/P (accounts payable) lag from 30 to 45 days extracts a loan from your suppliers.

The accounts receivable lag impacts the customer survey score. At 90 days the score is reduced 0.7%. At 60 days the score is reduced 7%. Offering no credit terms (0 days) reduces the score by 40%.

On the website, log into your simulation then click the Reports link.

From the Capstone Spreadsheet, click the Reports menu.

5 The Capstone Courier

Customer purchases and sensor company financial results are reported in an industry newsletter called the Capstone Courier.

The Courier is available from two locations:

- On the website, log into your simulation then click the Reports link;
- From the Capstone Spreadsheet, click the Reports menu.

The Courier displays “Last Year’s Results.” The Courier available at the start of Round 1 displays last year’s results for Round 0, when all companies have equal standing. The Courier available at the start of Round 2 will display the results for Round 1.

Printing the Courier can make it easier to review. From the Excel spreadsheet, click the printer icon; from the website, click the Print link under the Courier’s Table of Contents.

Successful companies will study the Courier to understand the marketplace and find opportunities. As the simulation progresses and strategies are implemented, company results will begin to vary.

5.1 Front Page

Use the first page of the Courier to see a snapshot of last year’s results. Be sure to compare your company’s sales, profits and cumulative profits with your competitors’.

5.2 Stock & Bond Summaries

The Stock and Bond Summaries (page 2) report stock prices and bond ratings for all companies. The page also reports the prime interest rate for the upcoming year.

5.3 Financial Statements

Financial Statements (page 3) surveys each company’s cash flow, balance sheet and income statements. This will give you an idea of your competitors’ financial health. In-depth financial reports for your company are also available (see Chapter 6).

5.4 Production Analysis

The Production Analysis (page 4) reports detailed information about each product in the market, including sales and inventory levels, price, material and labor costs. Are you or your competitors building excess inventory? Excess inventory puts pressure on profits (see “10 Forecasting”).

The Production Analysis also reports product revision dates. Does a competitor have a product with a revision date in the year after the
Segment Analysis Reports

year of the report? This indicates a long repositioning project that will possibly put that product into another segment.

If a revision date has yet to conclude, the Courier will report the product’s current performance, size and MTBF. The new coordinates and MTBF will not be revealed until after the completion of the project.

Check your competitors’ automation, capacity and plant utilization. Increases in automation reduce labor costs and this could indicate competitors might drop prices for those products. Did a competitor reduce capacity? Selling capacity reduces assets. Running the remaining capacity at 150% to 200% can improve Return on Assets (ROA).

The Production Analysis will report the release date (but not the coordinates) of a new product if:

- Production capacity is purchased; and/or
- A promotion budget is entered; and/or
- A sales budget is entered.

Are your competitors investing in capacity and automation? The Production Analysis reports capacity and automation ratings for the upcoming round. The Financial Statements survey reports the cost of plant improvements for all companies.

5.5 Segment Analysis Reports

The Segment Analysis reports (pages 5 - 9) review each market segment in detail (Figure 5.1).

The Statistics box in the upper-left corner reports Total Industry Unit Demand, Actual Industry Unit Sales, Segment Percent of Total Industry and Next Year’s Growth Rate. The Customer Buying Criteria box ranks the customer criteria within each segment:

- Ideal Position: The preferred product location as of December 31 of the previous year (the preferred location is also called the ideal spot—ideal spots drift with the segments, moving a little each month);
- Price: Every year on January 1, price ranges drop by $0.50—this is the price range from last year;
- Age: Age preferences stay the same year after year;
- Reliability: MTBF requirements stay the same year after year.

Are your products meeting your buyers’ expectations?

The Perceptual Map shows the position of each product in the segment as of December 31 of the previous year.

5.5.1 Accessibility, Market Share and Top Products In Segment

The Accessibility Chart rates each company’s level of accessibility. Accessibility is determined by the Marketing Department’s sales budget—the higher the budget, the higher the accessibility. Accessibility is measured by percentage; 100% means every customer can easily interact with your company—sales, customer support, etc.

The Market Share Actual vs. Potential Chart displays two bars per company. The actual bar reports the market percentage each company attained in the segment. The potential bar indicates what the company deserved to sell in the segment. If the potential bar is higher than the actual, the company picked up sales because other companies under produced and stocked out (ran out of inventory).

The Top Products in Segment area reports, in order of total sales:

- Market Share
- Units Sold to Segment
- Revision Date
- Stock Out (Whether the product ran out of inventory)
- Performance and Size coordinates
- Price
- MTBF
- The product’s Age on December 31
- Promotion and sales budgets
5.5.2 Awareness and the December Customer Survey Score

Customer Awareness is determined by the Marketing Department’s promotion budget—the higher the budget, the higher the awareness. Awareness is measured by percentage; 100% means every customer knew about your product. The December Customer Survey Score indicates how customers in the segment perceived the products. The survey evaluates the product against the buying criteria.

Product ages and distances from ideal spots change throughout the year, therefore scores change month to month.

If a repositioning project concludes late in the year, the survey score for December could be significantly higher than the scores for the previous months.

Use the customer survey score as a quick comparison tool when conducting a competitive analysis. Perfect scores are almost impossible. Scores of 50 or above are considered good.

5.6 Market Share Report

The Market Share Report (page 10) details sales volume in all segments, reporting each product’s actual and potential sales. Did your company underproduce? If the actual percentage for your product is less than the potential, you missed sales opportunities. If your actual is greater than your potential, your competitors underproduced and you picked up sales that otherwise would have gone to them.

5.7 Perceptual Map

The Perceptual Map (page 11) displays all the segments and every product in the industry.

Are your products competitively positioned?

5.8 Other Reports

The HR/TQM/Sustainability Report displays investments and results when the optional TQM/Sustainability, Human Resources and/or Labor Negotiation modules are activated (see Chapter 7).

If simulation plug-ins are scheduled, the results will also display. For example, the Corporate Responsibility and Ethics report shows the impacts of each company’s decisions (see Chapter 8).

6 Proformas and Annual Reports

Proformas and annual reports include:

- Balance Sheet
- Cash Flow Statement
- Income Statement

Proformas are projections of results for the upcoming year. Annual reports are the results from the previous year. The proformas allow you to assess the projected financial outcomes of your company decisions entered in the Capstone Spreadsheet.

To access proformas, click the Proformas menu in the Capstone Spreadsheet. To access the annual reports, click the Reports menu in the Capstone Spreadsheet or, on the website, log into your simulation and then click the Reports link.

The proforma reports are only as accurate as the marketing sales forecasts. If you enter a forecast that is unrealistically high, the proformas will take that forecast and project unrealistic revenue (see “10 Forecasting” for more information).

6.1 Balance Sheet

The balance sheet lists the dollar value of what the company owns (assets), what it owes to creditors (liabilities) and the amount contributed by investors (equity). Assets always equal liabilities and equity.

\[ \text{Assets} = \text{Liabilities} + \text{Equity} \]

Assets are divided into two categories, current and fixed. Current assets are those that can be quickly converted, generally in less than a year. These include inventory, accounts receivable and cash. Fixed assets are those that cannot be easily converted. In the simulation, fixed assets are limited to the value of the plant and equipment, (see “4.3.1 Capacity” and “4.3.3 Automation”).

Liabilities include accounts payable, current debt and long term debt. In the simulation, current debt is comprised of one year bank notes; long term debt is comprised of 10 year bond issues. Equity is divided into common stock and retained earnings.

Retained earnings are a portion of shareholders’ equity. They are not an asset.

Common stock represents the money received from the sale of shares; retained earnings is the portion of profits that was not
6.3 Income Statement

Your company can use the income statement to diagnose problems on a product by product basis. Sales for each product are reported in dollars (not the number of products). Subtracting variable costs from sales determines the contribution margin. Inventory carrying costs are driven by the number of products in the warehouse. If your company has $0 inventory carrying costs, you stocked out of the product and most likely missed sales opportunities. If your company has excessive inventory, your carrying costs will be high. Sound sales forecasts matched to reasonable production schedules will result in modest inventory carrying costs.

Period costs are depreciation added to sales, general and administrative (SG&A) costs (which include R&D, promotion, sales and administration expenses). Period costs are subtracted from the contribution margin to determine the net margin. The net margin for all products is totaled then subtracted from other expenses, which in the simulation include fees, write-offs and, if it is enabled, TQM/Sustainability costs. This determines earnings before interest and taxes, or EBIT. Finally, interest, taxes and profit sharing costs are subtracted to determine net profit.

Once your decisions are final, you can print your proforma income statement (click the printer icon). When the simulation advances to the next year, you can compare the results to your proforma projections.

7 Additional Modules

Some simulations use additional modules. If a module is scheduled, the simulation Dashboard will tell you the round it is set to begin and provide a link to complete documentation.

The HR (Human Resources) and TQM (Total Quality Management)/Sustainability modules described below are frequently enabled. HR and TQM decisions are used by the Balanced Scorecard, which is one of the simulation assessment methods (see Chapter 11). Other modules include Labor Negotiation and Advanced Marketing.

7.1 TQM/Sustainability

TQM (Total Quality Management)/Sustainability initiatives can reduce material, labor and administrative costs, shorten the length of time required for R&D projects to complete and increase demand for the product line. The impacts of the investments produce returns in the year they are made and in each of the following years.

The two sustainability-oriented initiatives, the UNEP Green Program and GEMI TQEM, can lower labor and material costs. The UNEP Green Program also can improve customer perceptions about your company, which lead to increased sales. The remaining initiatives can also increase efficiency and lower costs.

Your company should determine which initiatives best serve its purposes. If you plan to keep automation levels low so R&D projects complete more quickly, you might want to invest in areas that lower labor costs (for example, Quality Initiative Training). If your company is competing in the high technology segments, with high material costs, you might consider initiatives that reduce material costs (for example, Continuous Process Improvement).

To maximize the effect, companies should find complementary initiatives and invest in each of them. For example, to reduce material costs, companies should consider investing in both CPI Systems and GEMI TQEM Sustainability.

7.2 HR (Human Resources)

When the Human Resources Module is activated, three areas must be addressed:

1. Complement: The number of workers in the workforce. Needed Complement is the number of workers required to fill the production schedule without overtime.

2. Caliber: The talent of the workforce. If you are willing to spend the money, you can recruit a higher caliber of worker. This results in higher productivity and lower turnover. Companies set a Recruiting Spend budget of up to an additional $5,000 per worker. If you spend nothing extra, the recruitment cost per worker remains at $1,000 and you get an average person off the street. The more you spend, the higher the caliber of the worker.
3. Training: The amount of time workers spend in training each year. Training leads to higher productivity and lower turnover, but takes people off the job while they are in the classroom. Each training hour costs $20.00 per worker.

Assuming you have sufficient workers (Complement), investments in Recruiting and Training raise your Productivity Index, which in turn lowers your per unit labor costs.

8 Plug-Ins

Some simulations use plug-in modules. Plug-ins have a more general impact on your company. For example, the Corporate Responsibility and Ethics plug-in described below will have an impact on your corporate profits.

If a plug-in is scheduled, the simulation Dashboard will tell you the round it is set to begin and provide a link to complete documentation.

8.1 Corporate Responsibility and Ethics

There are many reasons to responsibly and ethically run an organization. Perhaps the strongest reason is legal compliance. Anti-corruption laws (Sarbanes Oxley in the U.S. and UK Bribery Act 2010 in Britain to name two) have refocused business accountability; businesses must now proactively ensure that their employees’ activities are legal. In other words, being unaware of employee actions or employees acting without direct instruction or approval are no longer adequate excuses.

8.1.1 Compliance

Many corporations require employees to be familiar with their codes of ethics and business conduct. From a business perspective, this potentially can lead to cost savings. For example, workplace harassment can result in large settlements, not to mention lost productivity as the issue is reviewed and possibly litigated. A prominent ethics program can reduce negligence exposure if a claim comes to court or a regulatory agency weighs an action. Similarly, false advertising and verbal assurances can be expensive to settle, especially if they become a class action. Under these circumstances an effective ethics program can mitigate the situation.

8.1.2 You’re Compliant until You’re Caught

In today’s wired society, social media and other outlets increase the likelihood of non-compliance being brought to regulators’ or the public’s attention. Even if these do not result in legal or civil actions, from a public relations standpoint, the perception of non-compliance can be disastrous in the marketplace. Again, a strong code of ethics can be your insurance in these situations.

8.1.3 Ethical Management Can Be Good Management

The jury is still out as to whether managers should be held to professional standards similar to those for the legal, accounting and medical professions: Business graduates are not required to recite the equivalent of medicine’s Hippocratic Oath. However, doing so could be good business. Consider one of the most successful and fastest growing companies of all time, Google. Their corporate motto is “Don’t be evil.” Obviously Google is successful for many reasons beyond their official outlook, but no one can say they are less successful because of it.

In the simulation, you might be asked to weigh solutions to difficult situations. If you are working as a group, you will be required to come to a consensus. Your decisions will have a direct impact on your financial results.

As an optional exercise, your team could consider writing a code of ethics for your company.

8.1.4 Making Decisions

Your simulation might ask you to make decisions when a situation arises that requires a judgment of values. Your task is to find ways to ensure compliance and minimize exposure while returning value to all stakeholders. Group discussion and consensus is imperative because your decisions will affect your financial results.

Your simulation Dashboard will notify you if your company needs to make Corporate Responsibility and Ethics plug-in decisions. In the following round, the results will appear in the Capstone Courier. If your instructor permits it, an expanded impact debrief will be available from the Reports link on the website.

9 Situation Analysis

The Situation Analysis will help your company understand current market conditions and how the industry will evolve over the next eight years.

The analysis can be done as a group or you can assign parts to individuals and then report back to the rest of the company.

To access the Situation Analysis, log in at the Capsim website and go to the Getting Started area.

A downloadable PDF version of the Situation Analysis is also available from the Getting Started area.
10 Forecasting

Forecasting requires a little math and a little logic. For example, does your forecast predict your product will acquire half a segment’s sales when there are four or five products in the segment? Unless your product’s positioning, age and MTBF are significantly superior to the other products and your price is at the low end of the range, it is not likely that you will acquire half the sales. Does your forecast predict you will take only one tenth of the sales when there are four or five products in the segment? Unless your product’s positioning, age and MTBF are significantly inferior and your price is at the high end of the range or above, chances are you can sell more.

Forecasts are used by the proformas to calculate financial projections (see Chapter 6). If you enter a forecast that is unrealistically high, the proformas will take that forecast and project unrealistic revenue.

If you do not enter values in the Your Sales Forecast cells, the proformas will use the Computer Prediction to project financial results.

10.1 Basic Forecasting Method

Last year’s sales can be a good starting point for this year’s forecasts. For example, if the segment growth rate for the upcoming year is 9.2%, you can say “all things being equal, we can expect to sell 9.2% more units this year than last year.”

Assume next year’s growth rate for Traditional is 9.2% and your Traditional product sold 1,100,000 units last year without stocking out (running out of inventory):

\[
1,100,000 \times 0.092 = 101,200
\]

Adding 101,200 to last year’s sales of 1,100,000 units gives you a starting forecast for the upcoming year of 1,201,200 units.

The statistic boxes on the Segment Analysis reports (pages 5 – 9 of the Courier) publish last year’s Industry Unit Demand and the Growth Rate for the upcoming year. Multiplying last year’s demand by the growth rate then adding the result to last year’s demand will determine this year’s demand.

If your product stocked out, calculate what it could have sold by multiplying the segment demand by the potential sales percentage reported on page 10 of the Courier, the Market Share Report. Next, multiply that by the segment growth rate.

Is this number valid? It is highly unlikely that the market in the upcoming year will be identical to the previous year. Prices will adjust, revision projects will complete—the playing field will change.

Still, this number can be a good beginning as you assess your product offer and speculate what your competitors will offer.

Keep in mind the possibility that your products sold because competitors who otherwise would have made sales under produced and stocked out. Page 10 of the Courier displays actual and potential sales as a percentage for each product. If your actual sales far exceeded your potential because your competitors under produced, you cannot count on them making the same mistake again.

Any new products about to come to market must have a plant. Plant purchases are reported on the Production Analysis (Courier, page 4).

10.2 Qualitative Assessment

Compare your product to others competing within the segment and decide whether it is better or worse than the competition. Start with the Courier Perceptual Map (page 11). It shows where products are currently placed. The Revision Dates at the bottom of the page reveal the timing of any future repositionings. Continue the comparison using the Courier’s Segment Analysis pages. These report each product’s:

- Age—does the product satisfy customer age demands?
- MTBF— is reliability near the top of the range?
- Price— will price trends continue or will new automation (displayed on page 4 of the Courier) facilitate a price reduction? (Remember, price ranges drop $0.50 per year.)
- Awareness and Accessibility— are these percentages leading, keeping pace with or falling behind other products?

All these elements contribute to the monthly customer survey.

10.2.1 December Customer Survey Score

Will your product be better or worse than average? As an estimate, look at the December customer survey score in the lower part of each Segment Analysis. 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 32/96 or 33%.

\[
\text{Top Product in Segment’s Score / Sum of All Scores} = \frac{32}{32 + 28 + 22 + 14} = \frac{32}{96} = 33\%
\]

What monthly customer survey scores will your product have during the year? The score will change from month to month because the segments drift, your product ages and it might be revised. Each monthly score is driven by how well your product satisfies the segment buying criteria, plus its awareness and accessibility levels. If the TQM/Sustainability module is on, some initiatives could increase the score. (See “How is the Customer Survey Score Calculated?” in the Online Guide’s FAQ/Reports section for more information on assessing your product.)
10.3 Forecasts, Proformas and the December 31 Cash Position

On the proforma income statement, sales revenue for each product is based on its price multiplied by the lesser of either:

- The Your Sales Forecast entry (or, if none is entered, the Computer Prediction); or
- The total number of units available for sale (that is, the Production Schedule added to Inventory).

When a forecast is less than the total number of units available for sale, the proforma income statement will display an inventory carrying cost. When a forecast is equal to or greater than the number of units available, which predicts every unit will be sold, the carrying cost will be zero.

On the proforma balance sheet, under current assets, inventory reflects the dollar value of all unsold units. Cash reflects the amount left after all company payments are subtracted from the sum of:

- Total sales revenue reported on the proforma income statement;
- Stock, current debt and long term debt entries in the Finance area.

The proforma balance sheet’s cash position also displays as the Finance spreadsheet’s December 31 Cash Position. Therefore, unrealistically high forecasts (or prices) will create cash predictions that are not likely to come true.

10.4 Worst Case / Best Case

If you wish, you can enter sales forecasts and production schedules that develop worst case / best case scenarios. Here is an example:

You generate a pessimistic forecast of 1,200,000 for your Traditional product, which predicts in the worst case monthly sales of 100,000 units. As a matter of policy, your management team might decide that manufacturing an additional three months worth of inventory, or 300,000 units, is an acceptable risk when compared to the potential reward of making extra sales.

In the Marketing spreadsheet, enter the worst case forecast of 1,200 in the Your Sales Forecast cell. In the Production spreadsheet, enter the best case of 1,500 in the Production Schedule cell (if inventory remains from the previous year, be sure to subtract that from the 1,500). At the end of the year, in the worst case you will have sold 1,200,000 units and have 300,000 units in inventory. In the best case you will have sold 1,500,000 units and have zero inventory.

The spread between the positions will show up as inventory on your proforma balance sheet. Your proforma income statement will also reflect the worst case for sales. In the Finance area, if the December 31 Cash Position is negative, adjust current debt, long term debt and stock issue entries until the December 31 Cash Position becomes positive. This will help ensure against an emergency loan.

To see your best case, return to the Marketing spreadsheet and enter 1,500 in the Your Sales Forecast cell then review the December 31 Cash Position. The actual results should lie somewhere between the worst and best cases.

11 Balanced Scorecard

Instructors can activate a performance measurement tool called the Balanced Scorecard. Balanced Scorecards allow companies to gauge their performance by assessing measures in four categories:

- Financial—includes profitability, leverage and stock price;
- Internal Business Process— ranks (among other measures) contribution margin, plant utilization and days of working capital;
- Customer—examines the company’s product line, including how well it satisfies buying criteria and awareness/accessibility levels;
- Learning and Growth—evaluates employee productivity.

11.1 Guiding Your Company

The Internal Business Process and Customer perspectives can crosscheck company performance. For example, under Internal Business Process, a low score for Contribution Margin generally indicates the company is unprofitable—the company should look at its cost and pricing structures. Under the Customer perspective, a poor Buying Criteria score suggests the company should consider R&D projects to improve the product line.
The Capstone Spreadsheet projects Balanced Scorecard results for the upcoming year (see the Proformas menu). Scores from previous years are available on the website; log into your simulation then click the Reports link.

12 Six Basic Strategies

These six basic strategies can be the starting point for your own custom strategy.

Broad Cost Leader

A Broad Cost Leader strategy maintains a presence in all segments of the market. The company will gain a competitive advantage by keeping R&D, production and material costs to a minimum, enabling the company to compete on the basis of price, which will be below average. Automation levels will be increased to improve margins and to offset second shift/overtime costs.

Mission Statement
Low-priced products for the industry: Our brands offer solid value. Our primary stakeholders are bondholders, customers, stockholders and management.

Broad Differentiation

A Broad Differentiation strategy maintains a presence in every segment of the market. The company will gain a competitive advantage by distinguishing products with an excellent design, high awareness and easy accessibility. The company will develop an R&D competency that keeps designs fresh and exciting. Products keep pace with the market, offering improved size and performance. Prices will be above average. Capacity will be expanded as higher demand is generated.

Mission Statement
Premium products for the industry: Our brands withstand the test of time. Our primary stakeholders are customers, stockholders, management and employees.

Niche Cost Leader (Low Technology)

A Niche Cost Leader Strategy concentrates primarily on the Traditional and Low End segments of the market. The company will gain a competitive advantage by keeping R&D, production and material costs to a minimum, enabling the company to compete on the basis of price, which will be below average. Automation levels will be increased to improve margins and to offset second shift/overtime costs.

Mission Statement
Reliable products for low technology customers: Our brands offer value. Our primary stakeholders are bondholders, stockholders, customers and management.

Niche Differentiation (High Technology)

A Niche Differentiation strategy focuses on the high technology segments (High End, Performance and Size). The company will gain a competitive advantage by distinguishing its products with an excellent design, high awareness, easy accessibility and new products. The company will develop an R&D competency that keeps designs fresh and exciting. Products will keep pace with the market, offering improved size and performance. The company will price above average, and will expand capacity as it generates higher demand.

Mission Statement
Premium products for technology oriented customers: Our brands define the cutting edge. Our primary stakeholders are customers, stockholders, management and employees.

Cost Leader with Product Lifecycle Focus

A Cost Leader with a Product Lifecycle Focus centers on the High End, Traditional and Low End segments. The company will gain a competitive advantage by keeping R&D, production and material costs to a minimum, enabling it to compete on the basis of price. The Product Lifecycle Focus will allow the company to reap sales for many years on each new product introduced into the High End segment. Products will begin their lives in the High End, mature into Traditional and finish as Low End products.

Mission Statement
Reliable products for mainstream customers: Our brands offer value. Our primary stakeholders are bondholders, stockholders, customers and management.

Differentiation with Product Lifecycle Focus

A Differentiation with a Product Lifecycle Focus strategy concentrates on the High End, Traditional and Low End segments. The company will gain a competitive advantage with excellent design, high awareness, easy accessibility and new products. The company will develop an R&D competency that keeps designs fresh and exciting. Products will keep pace with the market, offering improved size and performance. The company will price above average and will expand capacity as it generates higher demand.

Mission Statement
Premium products for mainstream customers: Our brands withstand the test of time. Our primary stakeholders are customers, stockholders, management and employees.
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