Welcome to Comp-XM®, an integrated evaluation tool that will allow you to demonstrate your business skills. Comp-XM® has two sections: a business simulation similar to the one you just completed and a series of quizzes, called Board Queries, that ask questions related to your simulation environment.

The Simulation

You will make four sets of decisions for the Andrews Corporation. Your competition, Baldwin, Chester and Digby, are run by computers. This creates a level playing field—all participants go up against a standard set of competitors. As with your previous simulation, the quality of your decisions directly affects the position of your company. Performance is evaluated using a Balanced Scorecard, an analysis technique that gauges results across four areas:

- Financial
- Internal Business Process
- Customer
- Learning & Growth

Board Queries

You will answer five sets of Board Queries. For example, you might be asked to conduct a break-even analysis on an increase in production automation or calculate the effect additional borrowing will have on your financial ratios. The Board Query quizzes use standard multiple choice and essay formats.

All the information needed to answer the queries appears within the pages of The Comp-XM® Inquirer, an industry newsletter similar to The Capstone® Courier or The Foundation® FastTrack. In Comp-XM® you work as an individual, which means all success will be attributed to your efforts. This is your chance to show your strategic vision, tactical abilities and business knowledge. Best of luck!

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YOUR REGISTRATION NUMBER

If your instructor or school did not give you a Registration Number, you will need to register online using a credit card or checking account.
1 BACKGROUND MEMO

Congratulations! You have just been recruited to head Andrews Corporation’s newest spin-off, Andrews Comp-XM® Corporation. The new unit concentrates Andrews’ biometric sensor efforts into a new, publicly traded company that has access to both the equity and debt markets.

In the next four years, the biometric sensor market will see a 59% increase in unit demand. Growth rates vary among the four market segments – Thrift, Core, Nano, and Elite.

The biometric sensor industry is a fast growing sector of the larger sensor industry:

- Andrews Comp-XM® Corporation has three competitors, biometric business units of Baldwin, Chester, and Digby corporations– these companies have well established strategic directions;
- There are four segments called Thrift, Core, Nano, and Elite;
- There are no labor unions, but there are opportunities to invest in Human Resources;
- Some companies have been investing in TQM (Total Quality Management)/Sustainability.

As CEO you will be ultimately responsible for the strategic direction of the Andrews Comp-XM® business unit and its tactical execution.

At the beginning of every year, the board of directors will ask you to respond to a set of questions about your situation. The questions will be drawn from recent activities within the industry as described in last year’s results, and from the situation that you expect to develop over the next year.

As CEO, you are responsible for all company decisions.

After satisfying the board’s questions, you will execute your plan by making operational decisions in Research & Development (R&D), Marketing, Production, Human Resources, TQM/Sustainability and Finance. Your performance will be assessed in a Balanced Scorecard.

A Balanced Scorecard is an analysis technique that gauges company performance.

1.1 MARKET SEGMENTS

The biometric sensor market evolved from two original markets, a low technology segment and a high technology segment. The original low tech segment split into Thrift and Core. The original high tech segment split into Nano and Elite (Figure 1.1). Because of this evolution, the segments are less distinct than the segments in your former business. Straddling two segments with a product is still viable, although you can expect straddling to become more difficult as the market evolves (see Figures 1.2 - 1.5 on page 2).

Each market segment expects different:

- Positioning
- Age Range
- Price Range
- Reliability (MTBF)

Price, age and MTBF ranges for each segment hold steady year after year. Positions are listed for December 31 of last year. Positioning expectations advance steadily every month.
1.1 Market Segments

1.1.1 THRIFT SEGMENT CRITERIA
Thrift customers seek proven products, are indifferent to technological sophistication and are price motivated:
- Price, $14.00-$26.00 – 55% of decision;
- Reliability (MTBF), 14,000-20,000 – 20% of decision;
- Ideal Position at the end of Round 0, performance 6.5 size 13.5 – 15% of decision;
- Age, 3 years – 10% of decision.

1.1.2 CORE SEGMENT CRITERIA
Core customers seek proven products using current technology:
- Price, $20.00-$32.00 – 46% of decision;
- Age, 2 years – 20% of decision;
- Reliability (MTBF), 16,000-22,000 – 18% of decision;
- Ideal Position at the end of Round 0, performance 8.6 size 11.4 – 16% of decision.
1.2 Growth Rates

Growth rates differ among the segments. Thrift and Core are growing at a slower pace, 11.0% and 10.0%, than Nano and Elite, 14.0% and 16.0%, (Figure 1.10).

Segment Growth Rates are reported in The Comp-XM® Inquirer’s segment analyses pages.

In the next four years, Thrift’s and Core’s percentage of the overall market will decline. Today, the number of units sold to the Nano segment is greater than those sold to the Elite segment. However, in four years, Elite’s unit sales will exceed Nano’s (Table 1.1 and Table 1.2).

1.1.3 Nano Segment Criteria

Nano customers seek cutting-edge technology that is small in size. Last year’s buying criteria were:

- Ideal Position at the end of Round 0, performance 10.5 size 7.5 – importance: 35%
- Price, $28.00-$40.00 – importance: 27%
- Age, 1 year – importance: 20%
- MTBF, 18,000-24,000 – importance: 18%

1.1.4 Elite Segment Criteria

Elite customers seek high reliability and cutting edge performance technology:

- Age, 0 years – importance: 34%
- Price, $30.00-$42.00 – importance: 24%
- Ideal Position at the end of Round 0, performance 12.5 size 9.5 – importance: 22%
- MTBF, 20,000-26,000 – importance: 20%

1.3 Rough Cut / Fine Cut

Positioning, Price, and Reliability work the same as they did at your last company. The segments drift every year. Rough cut and fine cut criteria still hold true for the Comp-XM® industry. Your product designs must meet at least the rough cut criteria before earning sales.

1.3.1 Segment Locations

As is in the larger sensor industry, the market segments in the Comp-XM industry move to the lower right. The outer rough cut circles measure 4.0 units; the inner fine cut circles measure 2.5 units. The segment centers for each round are listed in Table 1.3.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Coordinates</th>
<th>Rd 0</th>
<th>Rd 1</th>
<th>Rd 2</th>
<th>Rd 3</th>
<th>Rd 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrift</td>
<td>Performance</td>
<td>6.5</td>
<td>7.0</td>
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<td>9.0</td>
<td>9.8</td>
<td>10.6</td>
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</tr>
<tr>
<td></td>
<td>Size</td>
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<td>11.0</td>
<td>10.2</td>
<td>9.4</td>
<td>8.6</td>
</tr>
<tr>
<td>Nano</td>
<td>Performance</td>
<td>9.7</td>
<td>10.5</td>
<td>11.3</td>
<td>12.1</td>
<td>12.9</td>
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<td>7.5</td>
<td>6.4</td>
<td>5.3</td>
<td>4.2</td>
</tr>
<tr>
<td>Elite</td>
<td>Performance</td>
<td>11.4</td>
<td>12.5</td>
<td>13.6</td>
<td>14.7</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>Size</td>
<td>10.3</td>
<td>9.5</td>
<td>8.7</td>
<td>7.9</td>
<td>7.1</td>
</tr>
</tbody>
</table>
1.3 Rough Cut / Fine Cut

1.3.2 IDEAL SPOTS
For each segment, customers prefer products placed near the ideal spot, which is a position relative to the segment center (see Table 1.4 and Figures 1.11 - 1.14). The darkest areas indicate the ideal spots. The orange areas indicate the positioning rough cut.

1.3.3 Price
Price ranges in each segment have held steady for the past four years and will continue to do so for the next four years (see Table 1.5). Customers want the price of their product to lie within the expected range. As the price moves outside the expected range, demand for the product begins to fall. For each dollar outside the range, demand falls 16.7%. When price reaches $6.00 outside the range, demand reaches zero.

Table 1.6 Segment MTBF Ranges

<table>
<thead>
<tr>
<th>Segment</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrift</td>
<td>14,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Core</td>
<td>16,000</td>
<td>22,000</td>
</tr>
<tr>
<td>Nano</td>
<td>18,000</td>
<td>24,000</td>
</tr>
<tr>
<td>Elite</td>
<td>20,000</td>
<td>26,000</td>
</tr>
</tbody>
</table>

1.3.4 MTBF (MEAN TIME BETWEEN FAILURE)
Customers want reliability or MTBF to be within the ranges in Table 1.6. Within the range, the higher the reliability, the higher the demand. However, above the range customers are content and award no additional demand.

As the MTBF moves below minimum expectations, the product loses demand. For every 1,000 hours below the range, demand drops by 16.7%. At 6000 hours below the range, demand falls to zero.

Customers are indifferent to products with MTBFs above the guideline.
1.3.5 AGE

Customer age assessments vary from segment to segment, as shown in Figures 1.15 - 1.18. All other factors held constant, demand is highest when the age is at the ideal. For example, Core customers prefer products that are 2 years old. Products with that age are given a score of 10 (see Figure 1.16). Within each segment, products with scores above 6 (green areas) generally outsell products with lower scores; products with ages in the orange areas can be revised by Research & Development.

1.4 SELLER’S MARKET

In a Seller’s Market, all the good products in a segment stock out. Desperate customers turn their attention to the remaining undesirable products (which may even target another segment), as long as they are within the rough cuts for price, MTBF and positioning.

Product appeal is driven by the monthly Customer Survey Score (the December score is published in The Comp-XM® Inquirer segment analyses). Any product with a score of 1 or more competes for sales– the higher the score, the higher the appeal. As a product approaches any of the rough cuts, its score falls towards 0. Usually a product with very low appeal makes few sales. However, when all the “good” products stock out, what is known as a Seller’s Market is created. In a Seller’s Market, customers will accept marginal products as long as they fall within the rough cut limits. For example, desperate customers with no better alternatives will buy:

- A product priced $5.99 above the price range. However, at $6.00 customers reach their tolerance limit and refuse to buy the product;
- A product with MTBF 5,999 hours below the range. At 6,000 hours below the range customers refuse to buy the product;
- A product positioned just inside the rough cut circle on the perceptual map. Outside the circle they say “no” to the product.
2 DECISION SUMMARIES

Decision entries are made with a spreadsheet called CompXM.xls, which is similar to Capstone.xls and Foundation.xls. Please refer to your Capstone® or Foundation® Guide for general information. Passing the cursor over the red flags in CompXM.xls opens text boxes with specific information (Figure 2.1).

All Comp-XM® simulations utilize the Human Resources and TQM (Total Quality Management)/Sustainability modules. Decisions made in these modules can have wide ranging effects, including influencing product demand, R&D cycle times, productivity, material costs, labor costs and admin costs.

Human Resources decisions are made in two locations:
- The Workforce Complement is entered at the bottom of the Production spreadsheet;
- Recruit Spend and Training decisions are made on the Human Resources spreadsheet.

All TQM/Sustainability decisions are made on the TQM/Sustainability spreadsheet.

2.1 HUMAN RESOURCES ENTRIES

Workforce Complement entries control the number of workers employed by the company. Once production schedules are complete, the spreadsheet will display a Needed Complement. Matching the Workforce Complement to the Needed Complement ensures the company will have sufficient workers.

Having more workers than needed drives up labor costs as workers stand around doing nothing. Having fewer workers than needed results in worker overtime, which cuts into the efficiency of the workforce. Having significantly fewer workers than necessary will result in serious production shortfalls because labor will not be available to manufacture the sensors.

Recruit Spend allows the company to attract a higher caliber worker, which will increase the efficiency of the workforce as measured by the Productivity Index.

Training Hours will also increase efficiency. However Training Hours increase the Needed Complement because workers are in the classroom, not on the production lines.

Investments in Recruiting and Training raise your Productivity Index, which in turn lowers your per unit labor costs. Scheduling overtime reduces any gains to the Productivity Index. The Productivity Index cannot go below 100%. Refer to the flags on the Production and Human Resources spreadsheets for a thorough discussion of Human Resources entries.

2.2 TQM/SUSTAINABILITY ENTRIES

The TQM (Total Quality Management)/Sustainability module allows investments in areas that can complement a company’s strategy. Differentiators might want to reduce R&D cycle times, to ensure their products are newer and better positioned. Cost leaders might want to reduce material and labor costs, allowing them to reduce price while maintaining their margins.

The Best Case/Worst case table gives an indication of the return on investment. The impact is cumulative so cost reductions will continue in future years. Refer to the flags on the TQM/Sustainability spreadsheet for a thorough discussion of TQM/Sustainability entries.
3 COST RELATIONSHIPS

3.1 RESEARCH & DEVELOPMENT

3.1.1 RELIABILITY (MTBF)
Each 1,000 hours of reliability (MTBF) adds $0.30 to the material cost. A product with 20,000 hours reliability includes $0.30 X 20,000/1000 = $6.00 in reliability costs.

3.1.2 POSITIONING COSTS
Material costs are also driven by positioning (Figure 3.1). The higher the technology, the higher the cost. At the beginning of the simulation, the trailing edge of the Thrift segment has the lowest cost, at $1.00; the leading edge of the Nano and Elite segments have the highest costs, at $9.25. Positioning material costs decrease 3% to 4% per year.

3.2 MARKETING

3.2.1 PROMOTION BUDGET
Promotion expenditures reach diminishing returns at $3,000,000 for each product. Promotion buys awareness. You lose one third of your old awareness each year. Your promotion budget replaces lost awareness, and if the budget is high enough, makes gains towards 100% awareness. When a product reaches 100% awareness, promotion budgets of about $1,400,000 are needed to maintain it.

3.2.2 SALES BUDGET
Sales budgets buy segment accessibility. Although you budget by product, any product within the segment’s fine cut contributes to accessibility. Diminishing returns are reached at a budget of $3,000,000 for each product. Diminishing returns in the segment, however, are not reached until $4,500,000. You need at least two products in the segment’s fine cut to reach 100% accessibility. You lose one third of your old accessibility each year. Your sales budgets replace lost accessibility, and if the budgets are high enough, make gains towards 100% accessibility. When a segment reaches 100% accessibility, sales budgets of about $3,300,000 are needed to maintain it.

3.2.3 SALESMANSHIP
Sales budgets also allocate the time spent by the sales force selling the product. The higher the budget, the more time the sales force gives to the product. This can be useful if you wish to emphasize one product over another within the same segment. For example, if you are splitting a combined $4,000,000 sales budget between two products, you might spend $3,000,000 with one and $1,000,000 with the other. Your salespeople would emphasize one product over the other.

If your company runs out of cash, you will receive an emergency loan, which carries a 7.5% penalty above the Current Debt interest rate. Emergency loans convert to Current Debt in the following year.

3.3 PRODUCTION

3.3.1 PLANT PURCHASES
Floor space for each unit of capacity is $6.00. Add $4.00 for each point of automation. Additional capacity at an automation rating of 10.0 would cost $6.00 + $4.00 X 10.0 = $46.00 per unit.

Companies with better Bond Ratings have lower interest rates.

3.3.2 PLANT SALES
When you sell plant, you get $0.65 on each original dollar. Depending on the depreciated value of the plant, you could make a gain or a loss on the sale which will appear as a gain or loss on the Income Statement.

Comp-XM® uses a straight line depreciation method calculated over fifteen years.
3.4 Finance

3.3.3 SECOND SHIFT/OVERTIME
Labor costs increase 50% when a second shift is hired or when the first shift works overtime (see “3.5 Human Resources” below).

3.3.4 AUTOMATION
Increasing automation has a linear effect on labor costs. Between an automation of 1.0 (lowest) to 10.0 (highest), labor costs fall approximately 10% for each point of automation.

3.4 FINANCE

3.4.1 STOCK
Stock issues are limited to 20% of the company’s outstanding shares. You pay a 5% brokerage fee to issue stock. You can issue dividends which tend to (but do not always) improve stock price.

3.4.2 CURRENT DEBT
These are one year bank notes. Banks are willing to lend amounts up to 75% of the company’s account receivable, plus 50% of its inventory. There is no brokerage fee for current debt.

3.4.3 BONDS
These 10 year notes carry an interest rate 1.4 percent higher than the current debt rate in the year they were issued. Bondholders are willing to lend amounts up to 80% of the depreciated value of the company’s plant and equipment, that is, the assembly lines. You pay a 5% brokerage fee to issue bonds.

3.5 HUMAN RESOURCES

3.5.1 RECRUITING
Investing in recruiting a better quality employee increases productivity and decreases turnover, which will reduce your labor and HR admin costs. The effect of investing in recruitment is cumulative. You can spend up to $5,000 per person to hire better talent. The amount is added to the automatic recruitment charge of $1,000 for every new employee.

3.5.2 TRAINING
Each year, you can assign up to 80 hours of training per employee, which increases productivity. Each training hour costs $20. When employees are in training they are replaced with other employees, so the Needed Complement will increase as training hours increase. The effect of investing in training is cumulative.

3.6 TQM/SUSTAINABILITY
The TQM (Total Quality Management)/Sustainability module allows companies to invest in several initiatives. Different initiatives return different benefits. For example, some initiatives will reduce labor and material costs, others will reduce R&D cycle time (allowing you to re-engineer products faster), and others will increase product appeal or decrease administration costs. You don’t have to invest in all initiatives. The return on investment follows an S-curve (Figure 3.2). For each initiative, yearly investments less than $500,000 will create little improvement; yearly investments above $2,000,000 push well into diminishing returns. Investing more than $5,000,000 in the same initiative over a two or three year period creates little or no additional improvement. Aggressive spending in each initiative would involve spending $2,000,000 in year 1, $2,000,000 in year 2, and $1,000,000 in year 3.
4 REPORTS

Customer purchase and sensor company financial results are reported in an industry newsletter, The Comp-XM® Inquirer. The Inquirer has a notable difference from your previous industry report: There are now four Segment Analysis pages labeled Thrift, Core, Nano, and Elite. The Inquirer is available from two locations:

- From the Comp-XM® Dashboard, click the Comp-XM® Inquirer link (see 6.2 Dashboard on page 10);
- From the CompXM.xls workbook, click the Inquirer link in the menu bar.

5 SCORING

Scoring occurs in two parts, the questions posed by the board of directors or Board Queries, and a Balanced Scorecard which is driven by your Comp-XM® simulation results.

5.1 BOARD QUERIES

Board Queries are unique to each participant, although each question covers the same content; if a question applies to a product, the question might be posed about any of the products in the simulation.

Each simulation generates different numbers, so each question containing numbers varies by participant. Furthermore, product names and competitor assignments vary from participant to participant.

Here's an example of a Comp-XM® Board Query: You are asked to find the Net Margin for product Biff. Your classmate is asked to find the Net Margin for product Bold.

Both questions have the same level of difficulty, but the answers are based on different numbers.

5.2 BALANCED SCORECARD

Comp-XM® uses a Balanced Scorecard for simulation scoring. A Balanced Scorecard is a common analysis technique that allows companies to gauge their current performance and formulate future goals. Balanced Scorecards are divided into four areas:

- Financial
- Internal Business Process
- Customer
- Learning and Growth

Each Comp-XM® Scorecard is built from criteria which are assigned a weight—a level of importance. Criteria, weights and results for each round, and the criteria, weights and results for a final overall scorecard, are available from the Dashboard (see below).

As you enter decisions in CompXM.xls, projections of the balance scorecard results for the upcoming year are available via the proforma menu. Scores from previous years are available on the website; login to your simulation then click the Results/Scorecards link.
6 Website Instructions

Login to the website with the User ID and Password from your previous simulation. Select Comp-XM® (Figure 6.1). Review the brief introduction and continue through the Getting Started area.

6.1 Download CompXM.xls

From the Getting Started area, download the CompXM.xls workbook to your computer (you can get the spreadsheet later by clicking the Downloads link).
- You will open CompXM.xls as you did Capstone.xls / Foundation.xls;
- Be sure to enable Macros and enter the same User ID and Password you used to login to the website;
- The CompXM.xls workbook requires an Internet connection— it retrieves your work from the website when it opens and sends your work to the website when you save decisions.

Use the your User ID and Password from your Capstone® or Foundation® simulation to login to CompXM.xls.

6.2 Dashboard

When the introduction is complete, the system will bring you to the Exam Dashboard, an area where activities and information are accessed, including decision summaries and scorecard values.

6.3 Answering Board Queries

Each round, your Board of Directors presents you with a set of questions. You can answer these questions before, during, or after you make decisions for your company (we recommend before).
- From the Dashboard, click the Answer Board Query button;
- A new window opens asking you to authenticate that you are the person taking the exam— click I Agree;
- Next, a list of Board Query questions appears on the left (Figure 6.2 on page 11);
- A second link to the Inquirer is available from this window— you will need the Inquirer to answer most Board Query questions;
- To begin, click a question number in the column on the left (cursor, Figure 6.2);
- The associated question will appear on the right— questions will be either multiple choice or essay (some multiple choice questions require more than one selection).
- You do not have to answer the Board Query questions in any particular order— each question has a point value for correct answers (you can receive partial credit for some types of questions) and a check mark if you have already entered an answer;

Your answer is not recorded unless you click the Save Answer button.

- Answer each question;
- Re-select a question if you wish to change the answer.
6.3 Answering Board Queries

**Figure 6.2 Board Query Input Screen**

This year, your company expects profits to be close to $4,000,000. The Board of Directors has instructed you to increase Retained Earnings by approximately $2,000,000 without issuing or retiring stock. What Dividend will you pay shareholders this year?

- $4.00
- $3.26
- $17.00
- $0.10
- $2.50
- $1.38
6.4 Student Activities

6.4 STUDENT ACTIVITIES

There are five Board Queries and four Decision Rounds:
- Round 1 (Board Query 1 and Decision Set 1)
- Round 2 (Board Query 2 and Decision Set 2)
- Round 3 (Board Query 3 and Decision Set 3)
- Round 4 (Board Query 4 and Decision Set 4)
- Final (Board Query 5)

Board Query 5 is a set of wrap up questions. You will not be making decisions for Round 5. The final results of the simulation will be scored using the Balanced Scorecard.

6.5 ROUND SCHEDULES

To see round schedules, click the dates in the Dashboard’s Deadlines column.

Only the final deadline is enforced for self-paced exams.

If Comp-XM® is not self-paced, the Dashboard will display:
- The date and time when simulation decisions and Board Query answers are due.

6.6 SELF-PACED EXAMS

In self-paced mode, you make simulation decisions and answer Board Queries within a time frame established by your instructor.

6.6.1 ADVANCING SELF-PACED EXAMS

The Dashboard displays your progress in the current round of the exam—whether decisions have been uploaded from the CompXM.xls spreadsheet and how many Board Query questions have been answered. You will not be able to advance to the next round unless you have uploaded a set of decisions and answered at least one Board Query question. To advance from Round 1 to Round 2:
- On the Dashboard, click the Advance to Round 2 button;
- When the new page opens, click the button to confirm that you wish to advance to the next round.

You will not be able to change your answers or decisions for a round once you advance to the next round (for example, after you advance to Round 2, Board Query 1 will no longer be available and you will be working on Decision Set 2).