**New Device First-Year Profit Potential Analysis for MedicTronix**

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1. **Abstract:**

Rocco’s Simulation Services is the primary analyst responsible for analyzing the first-year profit potential of MedicTronix’s new device. To accurately analyze the first-year profit potential and predict the performance of their new device, it is necessary for us to perform a “What-if” analysis. Our analysis will rely on the data chart generated from simulating given project parameters and probabilities across several simulations. In this report, Rocco’s Simulation Services will analyze the first-year profit potential of MedicTronix’s new device and the likelihood of its success.

1. **Objective:**

The objective of our report is to help MedicTronix predict the likelihood of its new device to generate success by performing a “What-if” analysis to simulate several outcomes of its performance. Although MedicTronix has identified the key parameters in determining first-year profit, there are several uncertain variables within the parameters. Rocco’s Simulation Services’ goal is to help reduce the uncertainty for these variables and perform an accurate simulation for MedicTronix’s first-year profit potential. Considering the key parameters and probabilities, we can create a base case or baseline simulation to determine first-year profit potential. By using a computer simulation and performing a “What-if” analysis we were able to evaluate the first-year profit potential and accomplish our objective.

1. **Data Discussion:**

The primary inputs for creating our “What-if” analysis and predicting first-year profit potential are: selling price per unit (*p*), first-year administrative and advertising costs (, direct labor cost per unit , parts cost per unit , and first-year demand (d). Extra inputs that are necessary to complete our analysis are the range estimates for direct labor cost per unit, parts cost per unit, and first-year demand.

Through conducting market research and financial analysis, MedicTronix was able to estimate the value of the selling price per unit and first-year administrative and advertising costs with a high level of certainty. They also made base estimates for the values of direct labor cost per unit, parts cost per unit, and first-year demand, however, they were uncertain of the accuracy of these inputs. Due to this uncertainty, we included extra inputs made by MedicTronix in the scenario that the initial estimates for direct labor cost per unit, parts cost per unit, and first-year demand do not reflect their true values.

The values of key parameters estimated with a high level of certainty are the device’s selling price of **$2,495 per unit** and the first-year administrative and advertising costs of **$5,000,000**. The values of key parameters we are uncertain about are direct labor cost of **$1,400 per unit**, cost of parts of **$350 per unit**, and first-year demand of **25,000 units**. The extra inputs consist of ranges between **$1,200 and $1,600** for direct labor costs per unit, **$250 and $500** for parts cost per unit, and **0 to 50,000 units** for first-year demand. Additionally, the direct labor cost per unit can only take on values of **$1,200**, **$1,300**, **$1,400**, **$1,500**, and **$1,600** with probabilities of **10%**, **21%**, **38%**, **21%**, and **10%** respectively. These probabilities indicate the chance that the direct labor cost per unit will be either $1,200, $1,300, $1,400, $1,500, or $1,600.

Inputting these values into our model will allow Rocco’s Simulation Services to create a base case for the profit of year one. To achieve a more accurate prediction of the device’s performance over the year, we can further analyze the first-year profit potential by simulating the baseline scenario 1,000 times. By inputting key parameters with a high level of certainty, inputting the base estimates for uncertain variables, and inputting the range estimates, Rocco’s Simulation Services was able to evaluate the first-year profit potential of the new device.

1. **Model Methodology:**

Rocco’s Simulation Services assessed the situation and determined using a “What-if” analysis was the best way to perform the first-year profit analysis. This mode of analysis was chosen because it allowed us to express the relationship between the key parameters and the profit based on probabilities over 1,000 simulations. By expressing these relationships, we can more accurately analyze the first-year profit potential and the impact the uncertain variables exert on our projection.

Before creating our data chart and simulating the base case, we started by calculating our base case. To calculate our base case, it is necessary to input all variables into our model and create our probability stack. We designed the probability stack by inputting our range of estimated direct labor costs and their associated probabilities. Following, we created the intervals that the direct labor costs will be identified by adding 0.0 to the first percentage (10%) and working up until reaching 100%. Completing the probability stack, we used the VLOOKUP function in conjunction with the RAND function to pull out the value in the third column and return an estimated direct labor cost per unit. As a uniformly distributed range, the RAND function will take any value between the upper and lower bound values at an equal opportunity. We estimate the parts cost per using *Formula 1*.

***Formula 1: Parts Cost Per Unit = Lower bound + (Upper bound – Lower bound) \* RAND().***

Unlike uniformly distributed ranges, normally distributed ranges do not all have an equal probability of being chosen. The values act in a bell curve around the mean of the range. To estimate the demand, a normal distributed range, we took the mean and standard deviation of the demand provided by MedicTronix. Using *Formula 2* and *Formula 3* respectively, we calculated the values for mean and standard deviation (10% of demand).

***Formula 2: Mean = (Lower Bound + Upper Bound) / 2***

***Formula 3: Standard deviation = Mean \* 10%***

Using the NORM.INV function in conjunction with the RAND function returns us with an estimated demand based on its mean and standard deviation. After calculating and obtaining the values for our key parameters, we can calculate the first-year profit for MedicTronix’s new device using *Formula 4*.

***Formula 4:***

Finalizing our results, using the simulated values in the data table, Rocco’s Simulation Services was able to determine the profit mean, profit standard deviation, minimum profit, maximum profit, and probability that the profit will be less than zero. We performed the following functions to summarize our profit statistics.

***Function 1: Mean = AVERAGE*** *(profit array from data table)*

***Function 2: Standard Deviation = STDEV.S*** *(profit array from data table)*

***Function 3: MIN & MAX = MIN*** *(profit array from data table);* ***MAX*** *(profit array from data table)*

***Function 4: Probability Profit is less than zero*** *(COUNT IF(profit array from data table), “<0”) / COUNT(profit array from data table))*

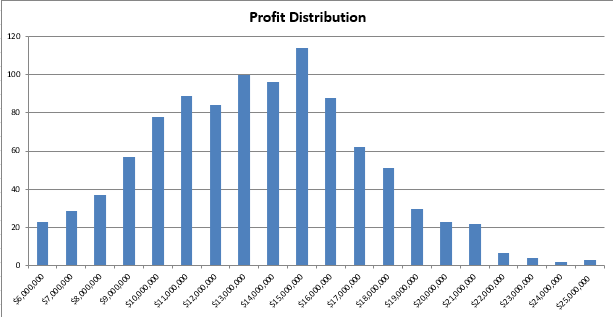
Using the values of direct labor cost per unit, parts cost per unit, demand, and first-year profit, we can create our data table to hold the “What-if” simulation values. After creating the data table, we created a profit distribution chart to observe the probability MedicTronix’s new device will perform in a profit range. To create this profit distribution, it was necessary to create a frequency table to calculate how often each value for profit occurs in the range of **$6,000,000** to **$25,000,000** in increments of **$1,000,000**.

1. **Analysis Results:**

The results of our analysis of MedicTronix’s new device tell us that they are in no danger of loss. Based on the MedicTronix’s key parameters and probabilities we can determined the profit mean, profit standard deviation, minimum profit, maximum profit, and probability that the profit will be less than zero.

In this iteration the mean is **$13,029,542**, the standard deviation is **$3,755,639**, minimum profit of **$3,724,368**, maximum profit of **$25,951,953**, and the probability profit will be less than zero is **0%**. In this iteration, we can see that the average profit MedicTronix will achieve is $13,029,542 and in the best-case scenario they will achieve a profit of $25,951,953, with a worst-case scenario profit of $3,724,368.

Analyzing *Figure 1* we can clearly see the distribution of profit based on the frequency each profit was achieved over the simulation. We can see that MedicTronix will most frequently earn a profit of **$15,000,000** in the range of **$6,000,000** to **$25,000,000** using increments of **$1,000,000**.



**Figure 1: First-Year Profit Distribution Chart**

1. **Suggestions:**

Following the results of our analysis, we suggest that MedicTronix continue the development of their new device. Based on our initial investigation, Rocco’s Simulation Services has concluded that MedicTronix is in no danger of loss. Although there is a large difference in the maximum and minimum potential profit, the average potential profit is above 50% of the maximum profit and there is a 0% chance that the company will return a loss from this device.

Investigating further and experimenting with the first-year profit potential after increased costs due to inflation, Rocco’s Simulation Services solidified its findings. In our second investigation, considering an increase in all costs due to inflation, MedicTronix’s new device continued to excel and was in no danger of losing profit. Rocco’s Simulation Services strongly suggests MedicTronix continues designing and prototyping their device because they have high potential to capture a substantial share of the market they compete in.

1. **Final Summary:**

Using our professional stock evaluation analysis, Rocco’s Simulation Services has determined that MedicTronix’s new device has the potential to capture a substantial share of the market they compete in. Through a careful investigation using a “What-if” simulation, we have confirmed the strength and security of MedicTronix in the first year. Due to the forecasted success and profit of their new device, MedicTronix would likely be a strong and safe company for one to invest in.