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BUSI 275 Business Statistics

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Data Description

Our group is analyzing historical data, projected costs and forecasted sales of two models of air conditioners in Columbia and Chile to assist a business in a decision about a financial investment in an accounting system that will enable the company to grow in the market by maintaining low overhead costs. We plan to use our data to do a time-series prediction that will help us determine the accounting system’s return-on-investment for the two models at the two plants.

The data we will be using for our analysis of this international sales opportunity is owned by a private company. We have been granted permission to use this data for the assignment under the condition that we change the product name and keep the company anonymous. In order to meet these conditions, we changed the product to air conditioners and for the purposes of this assignment; the company will be known as “Loper LLC.” We also changed the names of the two different models of air conditioners to CTEC (Centrifugal Force-Electrostatic Conditioner, which is used in industrial kitchens, hospitals and manufacturing facilities to extract 95% of the grease, smoke and chemical pollutants out of exhaust and air handling systems) and HRC (Heat Reclaim Concentrator, which is used in high heat industrial applications and environment to extract and recycle 95% of exhaust heat energy back into HVAC systems). The company also plans to review the results of our analysis so that it can be used to help make this business decision.

At this point in time our sample size is small, as we have monthly historical data from 2011 and projected sales and costs data for 2012, which only gives us 24 months of observations, so we need to obtain more observations. Currently we only have summaries and averages for some of our data, so we are looking to obtain the raw data with a larger sample size. We are in the process of narrowing down the focus of our analysis so that we know specifically what data to request from the business.

In this analysis we want to determine the break-even point for two plants two countries with two different models, and these variables are both nominal measurements. The two locations in our analysis are Columbia and Chile, and the two models are the CTEC and the HRC. We currently have more data on the costs of units in Columbia and are missing data in Chile, so we need to obtain more data on Chile. The HRC is a significantly smaller model, so the labor costs on the HRC will be significantly different for each model, so we will see a very different breakeven analysis for each plant.

In order to determine whether the company should invest in the accounting system now, we will be using a time-series unit of observation and there are several variables that will be applied to each air conditioner model. The first variable we will be considering is the cost of the manual calculation labor broken down by month, which is measured in dollars and thus is a ratio measurement. The manual calculations are currently limiting the company from increased sales volumes because Loper LLC is limited in its ability to calculate unless it hires more workers, which would be an additional cost. The manual labor costs for the calculations is calculated to be $32.41 per unit, and on average it costs the company $9,193 a month for these calculations with a standard deviation of $37.43. This variance is caused by a variance in the quantity of air conditioner models calculated. Currently we have data on the costs for the manual calculations for one year broken down into twelve months and the total cost in the year for the calculations is $110,200. The analysts in Loper LLC who are considering this international sales opportunity have informed our group that after the $1.5 million investment there are no additional costs to integrate it into the workflow, so this variable will help us to determine the saving in labor costs that are currently outsourced. We will then determine the return on investments if the company decides to invest in the company and what the costs of delaying the investment are by month.

Another variable we are considering is the fixed overhead and labor costs per month at the two locations. We currently have data on the 2012 standard labor and overhead costs in dollars per hour and per minute for Santiago as well as Saltillo, but we plan to obtain data on the fixed overhead and labor costs by month. The fixed overhead and labor costs are measured in U.S. dollars and are a ratio level of measurement. Right now we know that the fixed overhead and labor costs per hour in Santiago are $32.35, while in Saltillo the fixed overhead and labor costs are $40.87, as can be seen in the bar chart below.

This data helps us to predict that the break-even point for the two countries will likely be different because the costs are significantly higher in Saltillo. However, the volume of sales will also be another variable affecting the break-even point. We currently only have the rates for 2012, so we need to find data on the historical fixed overhead and labor cost from previous years, as well as find the costs in terms of months. We will apply these fixed rates to predict the total fixed overhead and labor costs at each location by month, which is necessary when determining the breakeven point.

The content cost for all of the parts is another variable we are considering with a ratio level of measurement that is measured in dollars per unit. We currently have the cost of 75 units in Columbia, but we are missing costs on four of the units. We are planning on obtaining two more sets to have 150 total units, but we also will need to find the content costs for Chile. These content costs will also affect the profit that the company and the costs and location impact whether or not the items will be duty exempt. We will use these costs per unit in combination with the number of units sold each month to determine the costs per month.

In addition to the content cost, we also need to consider the commercial price for each unit to determine the profit the company makes. We have the commercial price of 75 units in Columbia but the export prices of 4 units in the dataset do not match the commercial price, so we need to determine that data, and we need to gather more observations. The commercial price helps to determine the profit the company makes per unit and will be used to help determine the break-even point.

Another variable that we are considering is the sales volumes for each model at the two plants in Chile and in Columbia. We currently have historical sales volumes for each model in Santiago and Chile that measures the sales volumes in terms of air conditioner units per month, so this is a ratio level of measurement. However, we only have this historical data for the year 2011, so we need to obtain more data if possible. Loper LLC informed me that they do not have very much historical data prior to 2011 because they were not competitive, as other companies were selling their products for a much cheaper price. Then, in 2011 the company began to do the manual calculations and November was the first year that the vehicles qualified to be duty exempt, and thus it will be very important to see how the volume sales changed in the month of November. The data on this variable will help us to predict the number of sales that can be expected with the continuance of the manual calculations as opposed to the accounting system investment and is an important variable affecting the ROI. We also plan to use this data to help us determine whether part of the duty savings can be offered to the sellers as an incentive to sell the air conditioning units.

In addition to the historical sales volumes, we also have the projected sales volumes of both models from the two plants for 2012 and 2013, which is also a ratio level of measurement that is measured by number of units per month. The monthly projected sales for 2012 are shown in the bar chart above. The projected sales volume is very significant to the objectives of this analysis, as we want to be able to chart the increased costs associated with the increased sales that are projected with this data.

Another variable we are interested in is the average inbound freight costs for the CTEC and HRC models at the two locations. The average freight costs are a ratio level of measurement, but currently we have data on the 2012 Material Overhead Rates for Santiago and Saltillo that are measured as the percent of material costs and these rates include the in-bound logistics, duty/brokerage, material handling and returnable rack freight in Mexico. The MOH rate in Santiago is 4.38% and the rate in Saltillo is 3.78%. We need to determine the average freight costs for month by location and model though. The average freight costs are a significant variable because the inbound freight was a big unknown and the biggest delta in the fixed overhead costs between the two locations. These costs affect whether the vehicle is duty exempt depending on whether the freight was in the US or in Mexico. We also need to find data on the average outbound freight per model to the port where it is located onto a ship, because this affects whether the threshold is met as well and these affect the profit the company makes and when there is a return on investments.

Loper LLC is also considering offering incentive to the sellers of their product in order to increase sales, so another variable we is varying export duty saving. We have data on the total estimated savings when the duty saving are 5%, 10% and 15% and these savings are measured in dollars, so this is also a ratio level of measurement. The break-down of the total estimated duty savings is shown in the bar chart above. We have data on 75 air conditioning units and could potentially get more, but this data will help us to determine the portion of the savings can be offered to the dealer so that he will sell the units qualified in order to increase volume. However, in order to determine this, we may need to obtain data that will allow us to do an elasticity analysis to determine the extent to which the dealers will respond to the incentives.

Throughout this data collection process, we learned that although in some aspects it may be easier to be given data to analyze rather than having to collect it yourself, it is more difficult to interpret someone else’s data and to find the right type of data necessary to fulfill this assignment. Also, because we are only analyzing a small aspect of the international sales opportunity that the company is considering, we found that it was difficult to determine what data is actually relevant to our project. Throughout this process we will have to struggle to satisfy two different clients, our professor and Loper LLC, and thus will have to effectively communicate with both parties to make sure to maintain a high level of satisfaction. We still need to collect more data in order to conduct a time-series analysis with at least 80 observations and also need to focus more on the most essential variables influencing the factors of this business decision. We plan to remain in close contact with Loper LLC in order to ensure that we are getting the necessary data to meet the purpose of this analysis, which is proving to the company that they should make the financial investment in the accounting system now instead of later.