BUAD631: Operations Management and Management Science

InstraMatronics
Group 3

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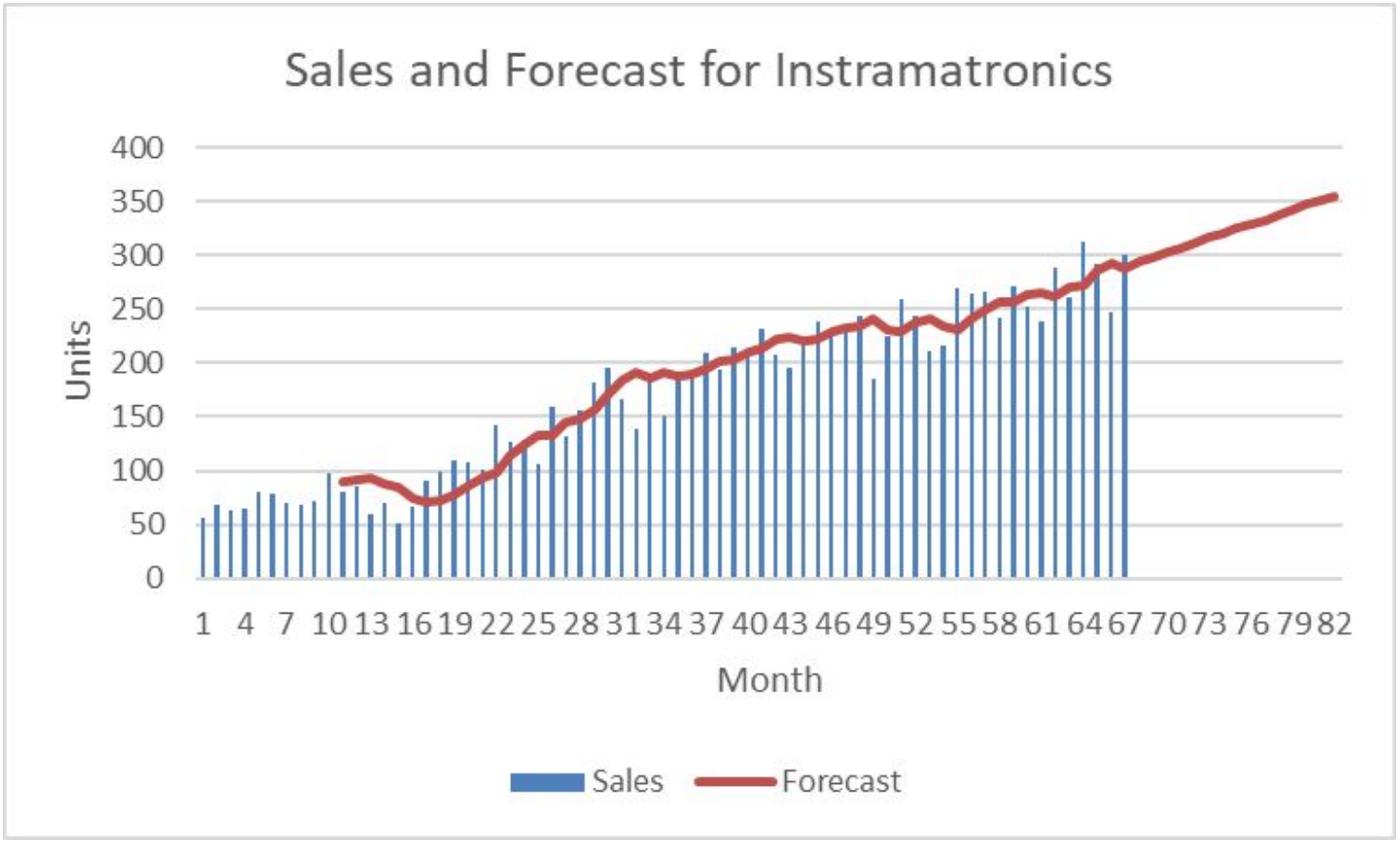
Graph of the sales data and forecasts from the spreadsheet



Recommendation for Q and brief highlights of analysis in finding Q

EOQ ≈ 23.45

The Economic Order Quantity (EOQ) provides a comprehensive analysis of the timing for reordering, the cost of placing orders, and the cost of holding inventory. If a company consistently places small orders solely to maintain the required inventory level, it would indicate significant spending on ordering costs, while the holding capacity of the company would be underutilized.

EOQ = √(2DS/H)

The EOQ formula operates under the assumption that consumer demand remains constant, as do ordering and holding costs. However, as evidenced by the graph, consumer demand has consistently increased, leading to higher sales and revenue. It's worth noting that we utilized both average sales and forecast data to assess demand over a 56-month period. Our analysis revealed a high level of accuracy in the forecasts, with an average variance of only -0.05 compared to actual sales. This enabled us to estimate demand for the last 15 months, for which sales data is not yet available.

(See Slide Tech 1 and 2 for calculations)

Recommendation for R and brief highlights of analysis in finding R

Reorder point R for lead time = DL + Safety stock = 564+185.38**= 749.38 or 750**

The reorder point ensures minimal risk of an item going out of stock, especially in cases of supplier delays or sudden surges in demand. This allows the company to maintain optimal inventory levels. Determining the right reorder point, which is a specific threshold level, is essential for ensuring timely replenishment.

The calculation of the reorder point involves incorporating the standard deviation of demand. We have also factored in the standard deviation in our calculations of the safety stock because demand is not constant and varies depending on the month. We have considered the new ideal service level to be 94% for reordering.

Our recommendations for updating Q and R are as follows:

Recommendation for Q:

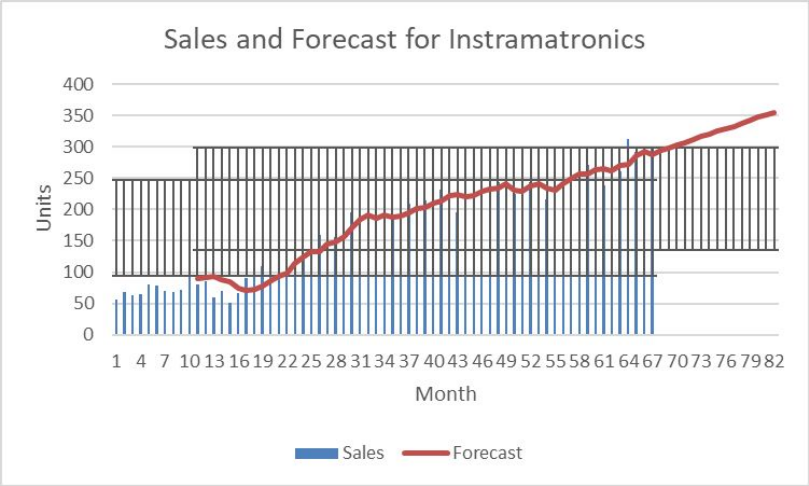
Our analysis indicates that the method the company is currently utilizing is effective. We observed only a -0.05 variance when compared to actual sales. Therefore, we would advise the company to continue using the same approach. The only point to mention here would be to consider ordering a few more units to avoid any potential shortages in the future.

Recommendation for R:

Since the ideal service level for reordering is set at 94%, the Safety Stock should be determined to achieve this service level. The standard deviation of demand and lead time should be considered in calculating the Safety Stock.

Therefore, to ensure timely replenishment and maintain optimal inventory levels, it is crucial to calculate the reorder point accurately by incorporating the standard deviation of demand and lead time, along with the desired service level of 94%. This will help mitigate the risk of stockouts, especially in cases of supplier delays or sudden surges in demand.

Technical Exhibit 1



	Sales	Forecast
Average for 56 months (Month 11 to month 67)	188.40351	188.35088
Difference	-0.05263	

We calculated the average for sales data and forecast and the forecast is off by just -0.05 units/month. Thus, we can confidently use forecast average as our anticipated / calculated demand while factoring in the -0.05 difference for future demand.

Technical Exhibit 2

Calculations to find EOQ

Given:

Purchase price (P) = $1,900
Demand per period (D) = 188
Ordering cost per order (S) = $500
Holding cost rate (H) = 18% of purchase price = 0.18 *$1,900 = $342

So, the calculated values for EOQ are:
D=188;S = $500;H = $342
EOQ = √(2DS/H) = √(2*188*500/342)
EOQ ≈ 23.45

Technical Exhibit 3

Calculations to find Reorder point R for lead time

Service level = 94% ; Z ≈1.55(from Normal Distribution Z-Table)
Standard Deviation = 69.1
Lead time (L)= 3 months
Standard deviation of demand during the lead time (L) = $\sigma dLT = \sigma d\sqrt{L}$ = 69.1√3 ≈ 119.6
DL = 188*3=564
Safety stock = $z\sigma dLT$ = 1.55*119.6 = 185.38
Hence,

Reorder point R for lead time = DL + Safety stock = 564+185.38**= 749.38 or 750**