PalArch's Journal of Archaeology of Egypt / Egyptology

APPLICATION OF FORECAST TECHNIQUES AT SATLUB - JEDDAH, SAUDI ARABIA

Nouran Abdulsalam Mohammed[1], *Mohamed Baymout*[2]

[1,2] College of Business, Effat University, Qasr Khuzam St., Kilo. 2, Old Mecca Road

P.O.BOX 34689, Jeddah 21478, Saudi Arabia

Email: [1]nmohammed@effatuniversity.edu.sa, [2]mbaymout@effatuniversity.edu.sa

Nouran Abdulsalam Mohammed, Mohamed Baymout Application of Forecast Techniques at Satlub - Jeddah, Saudi Arabia-- Palarch's Journal of Archaeology of Egypt/Egyptology 18(12), 136-143. ISSN 1567-214x

Keywords: Actual Demand, Forecast Techniques, Future Demand, Planning Process

ABSTRACT

This paper tackles a problem that many companies usually face while trying to anticipate future demand on certain products in order to avoid potential opportunity cost or to eliminate unnecessary inventory costs. Those companies frequently while they try to forecast future demand on their key products, they do not know what forecasting techniques or methods that are most suitable to their products. Consequently, they generate forecast that deviate heavily from the actual demand that their clients desire. SATLUB, a company that produces automobile lubricants is one of those companies that do not have a robust demand planning process. In this paper, data of three flagship products produced by SATLUB will be used to determine the best suitable forecasting technique to be used for the products. The forecasting technique which is Decomposition Classical Method will be used to plot and examine that data and patterns of the data will be studied. The results reveal the Decomposition Classical Method is a potential forecasting technique that SATLUB can use to forecast the future demand.

INTRODUCTION

Forecasting is a method or a technique that can be used for anticipating many future aspects of a business or other operation [1]. The characteristics of successful forecasting function depend on people, process, technology, and resources [2]. Preparation of forecasting can be categorized in two different ways. First is intuitively by using personal guts, feelings and assumption and the second is using a well-defined methodology in a systematic manner [2]. Forecasting has been through series of names. At the beginning it started as

forecasting, then it became business forecasting shifting to sales forecasting and then demand planning, and most recently supply chain forecasting [2].
Although Forecasting has become an essential technique that frequently use in our daily lives to predict the trend of certain data, the ancient history demonstrated that old civilizations had also used some techniques in order to predict the future [3]. Initially, forecasting started by economists who were specialized in macro type forecasting. They forecasted the state of economy and its effect on the overall health of a company [2]. William Stanley Jevons who studied the effects of economic fluctuations introduced the modern forecasting in 1865 [3]. After the Great Depression of the 1930s, business organizations had put their effort in understanding the worldwide economic disaster and many successful consulting firms emerged to provide forecasting help for governments and business [4]. Recently, forecasting process has shifted from forecasting the state of economy and overall effect on business to forecasting different features of a business such as demand, shipment, cash flow, and capacity and manpower requirement. Also forecasting is needed in manufacturing or retailing company for marketing, production and long-term strategic planning [5]. Marketing and production are the departments who frequently use forecasting technique in their daily operations. Marketing forecast for new and existing product line and production use this forecast for operation planning [6]. Forecasting sales considered the most difficult aspect of budgeting because it contains subjectivity. Management uses a number of methods to reduce subjectivity and obtain forecasts from different sources [7].

Recent researchers have found that a good forecast is based on experience, good judgment and selecting the model that fits. Forecasting is an extremely visible and politicized component of the business environment. The major forecasting mistakes an organization makes is making is constructing their plans around what they observe instead of what it believes will occur or happen [8]. A lot of companies spend too much time inspecting the validity of data source, how data is collected and processed, and how much time completeness of the data rather than trying to understand the data [9]. Since predicting plans for the future is a crucial aspect for any organization, the long-term success of both small and large organizations is relatively related to how well the organizational management is able to forecast its future and to implement appropriate strategies to deal with possible future situations [1]. Forecasting in business is thoroughly associated to understanding the business cycle [3]. Business forecasting is considered as both art and science, according to Bradshaw “The science is the mathematical formulas and the art is how you interpret these formulas for a particular market” [10]. Forecasting has key advantages, according to Bradshaw “Business forecasting is essential for two reasons: it units all of the employees of a company for a common goal, and variances from the forecast are early indicator of potential business problem. The owner can make correction before the problem hurts the company” [10].

Since businesses are becoming more dynamic, the significance of interpreting previous events and making realistic predictions about the future is certain to expand. The most significant future aspect of business forecast is that each day offers more historical data to analyze [11]. Therefore, this study identifies the

most suitable forecasting technique for SATLUB Company based on the data of three flagship products.

METHODOLOGY

There are two approaches used in this paper: quantitative and qualitative. Quantitative methods are measurement and sampling of numerical data that can be analyzed and manipulated using statistical methods. Qualitative methods tend to focus on the content and induction instead of measurement. It examines data without quantifying the data [12].

Quantitative approaches have four characteristics, descriptive, correlational, causal comparative, and true experimental. This study was based on true experimentation using numerical data and scientific methods. These methods will help in enhancing solutions as well as solving problems that SATLUB encounters. Additionally, historical data records will be plotted to aid in finding the best model that fits. The study started by investigates the reason behind the usage of the Indent method and examines the data in order to decide the appropriate model. MS-Excel spreadsheets will be constructed to aid in analyzing the data and creating reasonable solutions. The primary data were obtained through personal interviews in order to understand and analyze the complication of SATLUB.

The implementation of the qualitative method data collection started by exploring secondary data resources such as books, dictionaries, journals, and any business field related articles. Also, the secondary data were used in studying the transaction that contributes to the cases and forecasting disadvantage. In addition, primary data resources were used by interviewing the supply chain and project manager Ashish Garg. The interview was based on questions that can lead to information about the technique process that has been used in forecasting and to investigate what kind of problems they were facing. Also, set of questions were raised to understand the purpose of selecting this certain method, and the reasons of abandoned software which facilitate the forecasting procedure.

The Company has provided the MS-Excel spreadsheets that contain the sales figures of the past five years (2010- 2014). The sales figures involve their two flagship products which are Quartz and Rubia. This study focused on the fast-moving products including: Quartz 5000 SL 20W50 (24 B1L), Rubia S50 (6B5L) and Rubia TIR 6400 15W40 (2O8L).

Site Study

SATLUB are using a technique called “Indent”, which means product requirement. By the 25th of the month the Logistics Department receives sales plan for the next month from Sales and Marketing Department, this is validated by taking the sales average of three months then they decide whether they produce, procure or use their own inventory first by checking on pending sales orders (SOS), stocks and pending orders.

The produce or procure for the next month is calculated by subtracting the SOS from the stock and adding the pending order. Then divide the amount by the sales average and multiply it by number of days in one month.

{(SOS – STOCKS + PENDING ORDERS) / SALES AVERAGE} * 30

Recently, SATLUB has tried to improve the process by changing the technique name from "indent" to "sales planning" and reporting to the logistics department instead of reporting to the sales department. But this situation still has a wide gap between the actual demand and the forecasted one. This uncertainty can lead to stock out, customer dissatisfaction and inventory management problems. The main problem has been facing is lack of accuracy of the forecasts, which lead to negative effects on the supply chain model as decisions are built around these inaccurate forecasts.

SATLUB have been facing the deficiency in the forecasting methodology over the years, SATLUP have not tried to change the methodology or amend it dramatically just because the employee in the company had been using it and a change was simply not desired. Furthermore, although most well-known international companies have established forecasting system and used sophisticated software which can improve their decision-making process based around sound forecasts, SATLUB did not follow in the footsteps of these organizations as SATLUB merely use simple MS-Excel spreadsheets for processing the data and producing the forecasts which is a time consuming and inefficient process. Although SATLUB have SAP system that can aid to have a more accurate forecasting process with sophisticated capabilities. The lack of effective training result the SAP system not fully utilized. Sophisticated software allows a company to save time, explore different solutions and have better outcomes.

In order to find feasible solution for the fast-moving products at SATLUB, historical data were gathered to aid in understanding the sales pattern. The observation covers the period from August 2010 till September 2014. The sales data have been plotted to help in analyzing the data and finding the most suitable model. Since the company's data provided in trend with seasonality, the data were divided into seasonality basis: winter, spring, summer, and fall. In this manner, it would be easier to capture an accurate picture of the demand pattern and to reach to good and logical interpretation. The period of observation covers 16 quarters.

The model that was used with this kind of data is the Decomposition Classical Method with liner trend equation (Y=a+bx), where Y represents the sales and x represents the periods. Also, bias was used to check the performance and accuracy of the model. It measures the performance of the technique by calculating the error. It shows the difference between the actual demand and the forecasted one by summing up all errors. The measurement tools that are used in this paper are: The Mean Absolut Deviation (MAD), Mean Squared Error (MSE) and Standard Deviation (STDEV).

The MAD is calculated by summing up the absolute value of the forecast errors then dividing the outcome by the number of forecasts. The MSE is calculated in the same way but instead of using the absolute value they sum up the squared forecast error. The smaller errors the more accurate the models are. The standard deviation is the square root of MSE. It measures the uncertainty and the variation between the actual demand and the forecasted one. The smaller the standard deviation is the less the uncertainty.

RESULT AND DISCUSSION

Table 1 tabulates the validation of the decomposition model application on Quartz 5000 20W50. The MAD showed that the percentage of the error is 2% which consider being small and fit to the model. The MSE and STDEV are big due the sales volume as sometime SATLUB sell thousands of products in one month. A projection for the next period which is fall 2014 was applied.

Table 1: Qurtz 5000 20W50

Mean Absolut Deviation	2%
Mean Squared Error	11380164
Standard Deviation	3054.605
a	8963.175
b	1426.009
Equation	Y = 8963.175+ 1426.900
Forecast (Fall 2014)	32230

The graph in Figure 1 illustrates the actual demand and the forecasted ones. In fall 2010, the sales were low then it increased in winter and reached its peak in spring then it declined slightly in summer. The sales have had a trend with seasonality. For example, the sales increased dramatically in spring 2014. It seems that there is high demand in spring and summer due to the weather condition. The temperature is high and the vehicle's engine consumes a high level of lubricants. Another reason is the vacation as people traveling from one city to another using their cars. The forecast is meeting the demand in some point and the difference is insignificant.

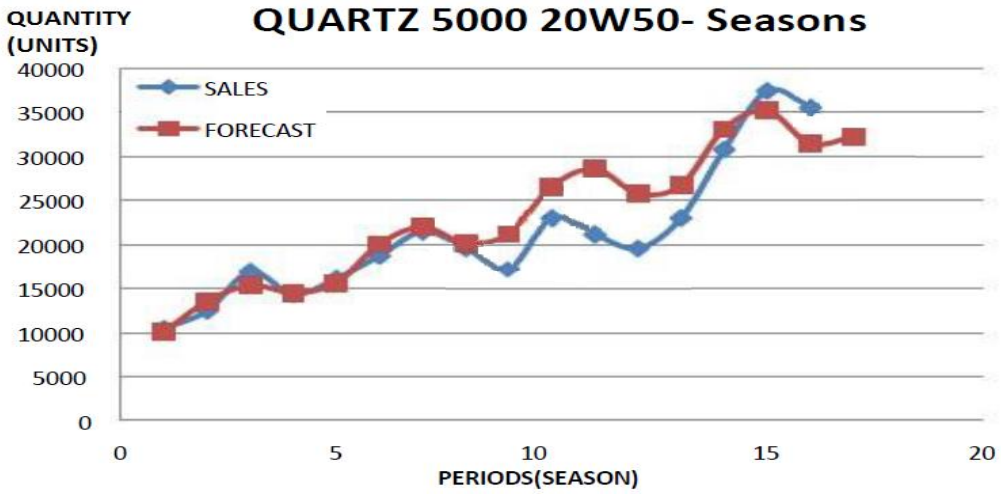

Figure 1: Qurtz 5000 20W50

Table 2 demonstrates the validation of decomposition model on Rubia S 50. The MAD is 9% which appears good and concludes that the model is applicable to the data. MSE and STDEV seem to be appropriate and big due the sales' huge volume. A projection of the next period was also applied.

Table 2: Rubia S 50

Mean Absolut Deviation	9%
Mean Squared Error	1898129
Standard Deviation	1170.706
a	3664.025
b	558.9015
Equation	Y= 3664.025+558.9015x
Forecast (Fall 2014)	10580.35391

The graph in Figure 2 demonstrates the actual sales and the forecasted ones for Rubia S50. The sales pattern is showing repetitive fluctuations as it decreased in winter while it increased in spring. Though, it slightly fell in summer and eventually declined dramatically in fall. The peak is reached in spring except for year 2011. The peak was reached in summer. The summer and spring have the highest demand due to temperature and vacations. The weather becomes dry and hot and the engine consumes high level of lubricants. Also the people start to travel throughout the kingdom using their cars. As shown in graph, the projection for fall 2014 declines.

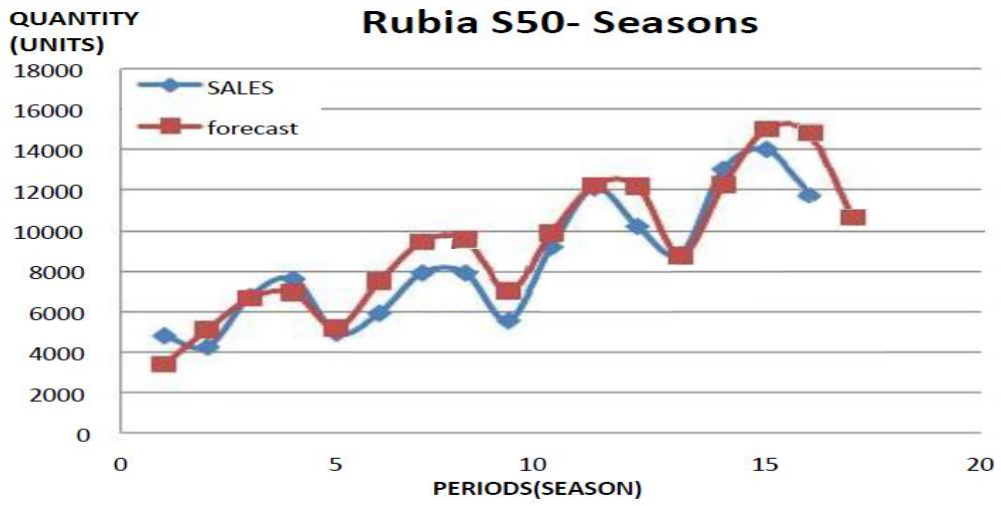

Figure 2: Rubia S 50

Table 3 tabulates the validation of forecasting techniques on Rubia TIR 6400. The MAD is big which mean that there is a problem in managing the forecasts.

Table 2: Rubia TIR 6400

Mean Absolut Deviation	34%
Mean Squared Error	149815.7
Standard Deviation	362.3487
a	1721.9
b	105.4676
Equation	Y=1721.9+105.4676x
Forecast (Fall 2014)	3754

The graph in Figure 3 illustrates the actual sales and the forecasted ones for Rubia TIR 6400. The sales are facing unpredictable demand. In fall 2010 the demand was low then it increased slightly in winter 2011 and continued to rise in spring until it reached its peak in summer. In fall 2011 the demand was low but it declined suddenly in winter and reached its peak in spring then decreased is summer. The pattern had extremely changed in the last periods as in fall 2013 the sales had reached the peak then the sales had dramatically declined.

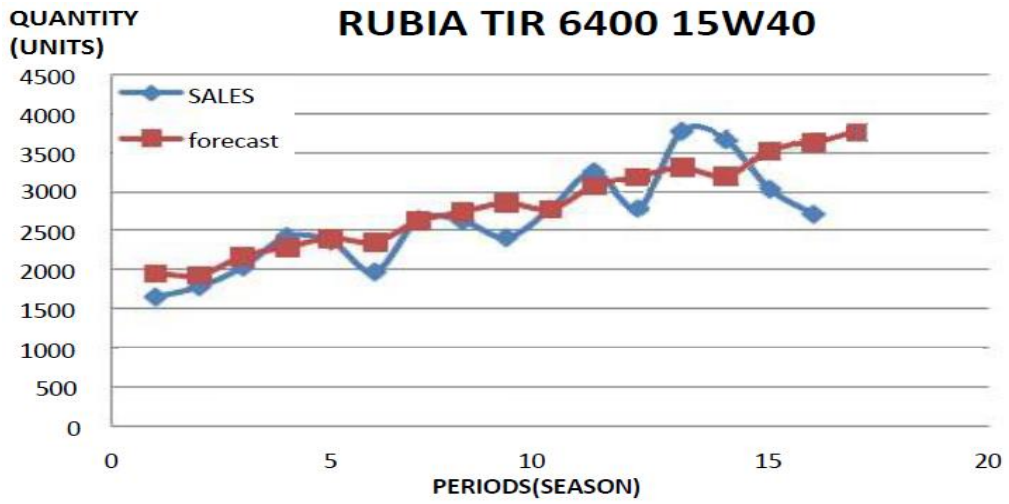

Figure 3: Rubia TIR 6400 15W40

CONCLUSION:

Forecasting can be considered as an expression of organization's targets or wishes. Companies are always working to keep their customers loyal and maintain good brand image. One of the main sources of keeping strong brand image is meeting the customer demand. Good Forecasting plays an important role in predicting customer demand while a bad one can have negative effects. This study shows applying proper forecasting techniques can lead to reduce the gap between actual demand and the forecast which will eventually lead to satisfying customer needs in a more proper manner. It also can be used as benchmarking to measure their performance. Furthermore, forecasting can serve as blueprint which guides the organization toward the right direction and know their position in the market. It also can help the company in updating their plans and give heads up of any change that might occur. Moreover, it is a useful tool that firms use to help them in managing their stocks and to raise

awareness about the fluctuations they face in the marketplace. Also, it can guide companies to anticipate problems that potentially might occur in the future regarding their production plans as well as their level of inventory. Identifying the best model and forecasting techniques are the first steps toward having a robust demand planning process. It was noticed that SATLUB, did not change the way they were projecting demands for decades and that was the reason behind their inefficient forecasts. After studying and evaluating the data and examining their pattern on three of their flagship products, the Decomposition Classical Method tends to be the most sufficient approach that can be used in forecasting future demand for these products. Continuous improvements to existing techniques should always be considered for organizations that seeks better production and inventory planning.

REFERENCES

Hillstrom, L. C. and Hillstrom, K. 2002. Encyclopedia of Small Business. Detroit: Gale. 2, 1, 523-525.

Jain, C. L. 2003. Business forecasting in the 21st century. The Journal of Business Forecasting Methods and Systems, 22, 3, 3-6.

Luft, R. 2001. Forecasting in Business. Encyclopedia of Business and Finance. New York: Macmillan Reference USA, 1, 393-397.

Malvasi, M. 2003. Business Forecasting. Dictionary of American History. New York: Charles Scribner's Sons, 3, 1, 586-588.

Ord, K., and Fildes, R. 2013. Improving Forecasting. In Principles of Business Forecasting. Mason, OH: South-Western, 488-489.

Nahmias, S. 2001. Production and Operations Analysis. Singapora: McGraw-Hill Book Companies.

Maher, M. W., Stickney, C. P., and Weil, R. L. 2012. Where to Start? With Your Customers - Forecasting Sales. In Managerial Accounting: An Introduction to Concepts, Methods and Uses. Mason, OH: South-Western. 11, 306-307.

Gilliland, M., 2003. Alternative metrics for forecasting performance. The Journal of Business Forecasting Methods and Systems, 22, 17-20.

Chase, Charles W., Jr. 1995. The realities of business forecasting. The Journal of Business Forecasting Methods and Systems, 14, 1, 2.

Hall, J. R. 2006. Business forecasting - A key to success. Air Conditioning, Heating and Refrigeration News, 229, 6, 36.

Reilly, T. 1994. Business forecasting: Today and tomorrow. The Journal of Business Forecasting Methods and Systems, 13, 3, 7.

W. A. Darity, Jr. 2008 Methodology. International Encyclopedia of the Social Sciences, 2, 5, 107-110.