

# Business Intelligent Smart Sales Prediction Analysis for Pharmaceutical Distribution and Proposed Generic Model

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**Abstract-** The role of sales forecasting in Pharmaceutical distribution companies (PDCs) cannot be belittled by enterprises, as the process of outlining business plans that are accurate and ensure complete advantage, have a forceful impact on the robust sales for the enterprise. This study therefore aims to develop a generic model “Business Intelligent Smart Sales Prediction Analysis”, to predict sales for PDC. The model is a combination of Historical data and Time Series Forecasting (TSF). In Pharmaceutical distribution companies, Inventory Management is the greatest challenge since companies are in a continuous effort to increase their profits and reduce their costs. The Time Series Prediction sales models were built with different approaches including ARIMA methodology, Neural network, Advance neural network, Fuzzy neural network and more. The purpose of this paper is to study economic benefits from Institutional level Public Outreach Campaign to business. More specifically, the paper explores analysis of Annual Average Sales Before 2014 Vs. Annual Average Sales 2014 onwards also through T – test analysis to find value is significant or non-significant.

**Index terms-** PDC’s- Pharmaceutical Distribution Company, CME - Continuing medical education, AAOS - American Academy of Orthopaedic Surgeons

## 1. INTRODUCTION

Strategic planning for the future is extremely important in any business to make definitive action. Owing to its great importance; the knowledge of forecasting has been growing very rapidly in modern times. Enhancing sales and operations planning through forecasting analysis and business intelligence is demanded in every industry and business. Many forecasting models have been developed to empower people in decision-making for various application areas. In business activities, forecasting technologies

have become indispensable tools in a wide range of managerial decision making processes, such as finance, banking, investments, employment, mortgages, and loans. Forecasts can be made based on either empirical qualitative analysis or mathematical quantitative analysis. Accordingly, forecasting models can be broadly classified as qualitative methods and quantitative methods. In Pharmaceutical distribution companies, sales forecasting plays a major role for enterprises in making business plans more accurate and gaining competitive advantage.

One of important factor which play role in sales forecasting is “Institutional level Public Outreach Campaign”. Awareness has increased through communication, educating constituents about the product and messaging is a key step in gaining acceptance. Where communication was valuable for product pre-launch and early-launch generation of awareness, the education phase is most effective for launched products or products with new uses or indications. In this phase, the goal of education is to inform interested parties about the advantages and benefits of products and provide meaningful content beyond just product promotion and audience capture. Underlying all of the advantages and uses of education is this fact: people tend to be brand-loyal to whomever taught them about that brand category. For this reason alone, a strong education component is an absolute necessity for the marketing and promotion strategy for any pharmaceutical firm.

Consumers are becoming savvier and are looking for information that goes beyond the claims of advertising. They want substance and value. They want to become more educated because they believe that will make them smarter consumers, able to select

the most appropriate products for their needs at the best price. And they are looking for something else as well, some degree of comfort. If PDC's can give them the best education about their medical condition, they will assume that having that depth of knowledge and willingness to impart it means that PDC's is in the best position to select the most effective products to treat their condition.

The consumers of information are not limited to the end-users of the products. Consumers include healthcare professional's doctors, nurses and clinicians to whom we can provide both continuing medical education (CME) and more in-depth information on products to ensure that they are used most effectively. Internal audiences as well, such as pharmacists, sales forces and partners who need to learn the best way to present the products and the most effective way to highlight their key advantages are consumers too.

For all of these consumers, the best education is one that is interactive. Effective education requires an iterative, interactive component, not a one-sided indoctrination. Interactive tools can provide an on-going background assessment program that measures a user's answers and then delivers information at the most appropriate level of understanding and can redirect the user's attention to areas that he or she has clearly not yet grasped. This tutorial style of training and education is highly effective because it is focused on the knowledge and needs of the individual rather than that of a general public. And, not surprisingly, this individualized attention engages the user for a longer period of time than more generic instruction. Institutional level Public Outreach Campaign may be in the form of lectures, seminar, symposium or in-house training.

Thus, Key to success is strategic, well-crafted messages delivered directly to the target audience. Consistency and integration are key contributors to achieving and sustaining differentiation, client and channel engagement, and, ultimately, business acquisition and retention.

## 2. OBJECTIVE

a. To analyze Institutional level Public Outreach campaign, customers success and financial future benefits

b. To analyze benefit of Institutional level Public Outreach Campaign to business

a. Customer's success and financial future benefits PDC's are using form of customer satisfaction measurement to evaluate their product and service offerings. The positive effect of the perceived value of the firm's current offering on customer satisfaction is supported by empirical evidence (Anderson et al., 1994). The perceived value of a product can be defined as the benefit of using a product (customers' appraisal of a product attributes and performance) relative to the costs incurred (Lai et al., 2009). When the perceived value of a product is high, customers are motivated to repeat patronage (Yang and Peterson, 2004). When the perceived value is low, customers are more inclined to switch to competing brands (Johnson et al., 2006; Brodie et al., 2009). Customer satisfaction is also affected by expectations, which are based on customers' past experience and on outside sources such as word of mouth and general media (Bateson, 1989; Gronroos, 1990). Through the balanced scorecard framework, Kaplan and Norton (2004) assert that success with targeted customers provide a principal component for improved financial performance. This assertion is based on the following set of well-documented arguments. Customer satisfaction enhances customer retention, providing the firm with a loyal and stable customer base that secures future revenues (Anderson and Sullivan, 1993; Seiders et al., 2005; Pan et al., 2012). Moreover, loyal customers are willing to pay a premium prices (Homburg et al., 2005), are more receptive to cross-selling efforts, and less sensitive to prices (Stock, 2005). Customer satisfaction also induces positive word of mouth (Szymanski and Henard, 2001), which brings new customers and improves the efficiency of future investments (Luo and Homburg, 2007). Customer loyalty also improves profitability to retain customer than to replace them (Reichheld and Sasser, 1990).

Positive associations between customer satisfaction and future financial performance, such as sales, margin, or return on sales, have been documented in the resort sector (Banker et al., 2000) and in the telecom industry (Ittner and Larcker, 1998). Rust and Zarorik (1993) find a relationship between customer satisfaction and profitability for a health care organization. Hence, Gruca and Rego (2005) show

that customer satisfaction creates shareholder value by increasing future cash flow growth and reducing its variability. Anderson et al. (2004) find a positive association between customer satisfaction and shareholder value, as measured by Tobin’s q.

- b. To analyze benefit Of Institutional level Public Outreach Campaign to business  
To analyze benefit to business, T-Test analysis performed.

Secondary Date: 2010 – 2018

Data are dived into two parts

- a. Annual Average Before 2014
- b. Annual Average Sales 2014 Onwards

Data form:

- a. Sales Data & Course detail & duration
- b. No of times course performed on various institutions

Customer details are:

| Sl No | Customer     |
|-------|--------------|
| 1     | AFH          |
| 2     | MOH/MOH INTL |
| 3     | PH           |
| 4     | RH           |
| 5     | SQUH         |

Table 1.1 – Customer List

Different type of course is performed in form of training, education, symposium and workshop

| Sl. No | Description  | Sl. No | Description                  |
|--------|--|--------|------------------------------|
| 1      | Advanced Surgical Approaches for Hysterectomy & Myomectomy | 9      | Corail Learning Centre       |
| 2      | Advances in Surgical Hemostasis Course - General Surgery   | 10     | AO-Spine course              |
| 3      | American Academy of Orthopaedic Surgeons (AAOS)            | 11     | Mini Gastric Bypass training |
| 4      | Bariatric  | 12     | Laparoscopic                 |

|   |  |    |  |
|---|--|----|--|
|   | symposium                                    |    | Hernia Repair Course                     |
| 5 | Bleeding management                          | 13 | Office and Operative Hysteroscopy Course |
| 6 | Intermediate Knee Arthroscopy Cadaver Course | 14 | DepuySynthes Spine Dry Workshop          |
| 7 | Mentor Surgical Excellence Course            | 15 | NDP training course                      |
| 8 | Stress Urinary Incontinence Cadaver course   | 16 | Fundamentals of Colorectal Surgery       |

Table 1.2 – Course Detail

Presentation frequency & Percent

| Sl No | Customer                 | Frequency | Percent |
|-------|--------------------------|-----------|---------|
| 1     | AFH                      | 2         | 3.4     |
| 2     | MOH & Associate Hospital | 12        | 20.3    |
| 3     | PH                       | 10        | 17      |
| 4     | RH                       | 21        | 45.6    |
| 5     | SQUH                     | 8         | 13.6    |

Table 1.3 – Presentation frequency & Percent

### 3. ANALYSIS REPORT: SALES TO THE BIG CUSTOMER BEFORE AND AFTER EDUCATION

| Customer | Annual Average Before 2014 | Annual Average Sales 2014 Onwards |
|----------|----------------------------|-----------------------------------|
| AFH      | 24482                      | 30404                             |
| MOH      | 99223                      | 85729.8                           |
| MOH INTL | 46583.66667                | 66097.6                           |
| PH       | 76405                      | 98337.6                           |
| RH       | 122458                     | 185148.4                          |
| SQUH     | 135074.3333                | 116371.4                          |

Table 1.4 – Sales- Before & After Education

### 4. RESULT ANALYSIS & CONCLUSION

95% CI for mean difference: (-17971, 43925)

T-Test of mean difference = 0 (vs not = 0):

T-Value = 1.08

P-Value = 0.330

Model

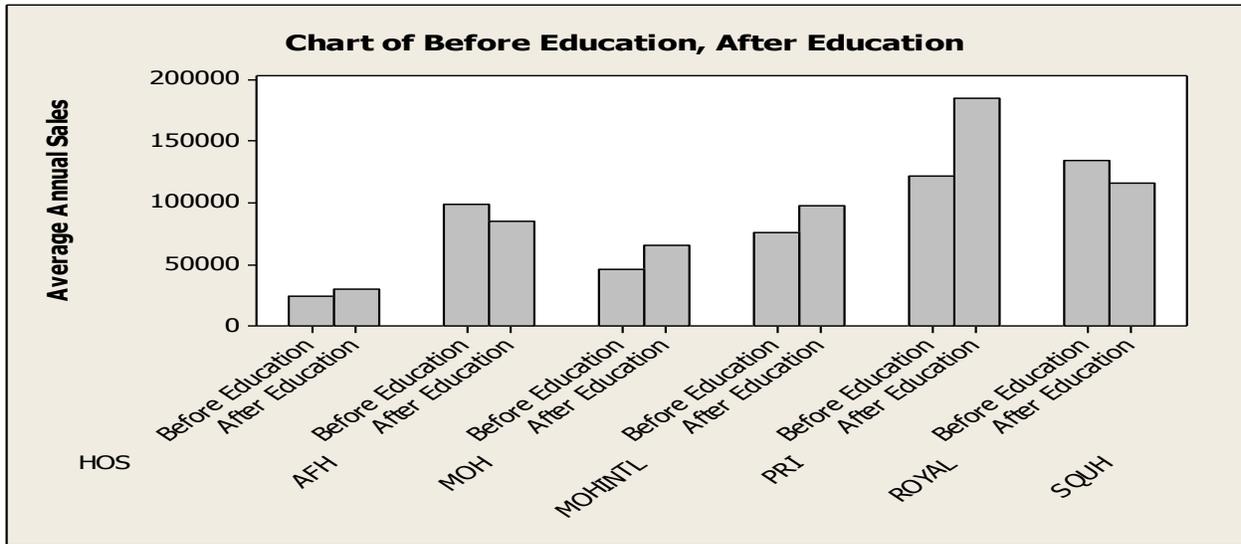


Figure 1.1 – Chart of Before Education & After Education

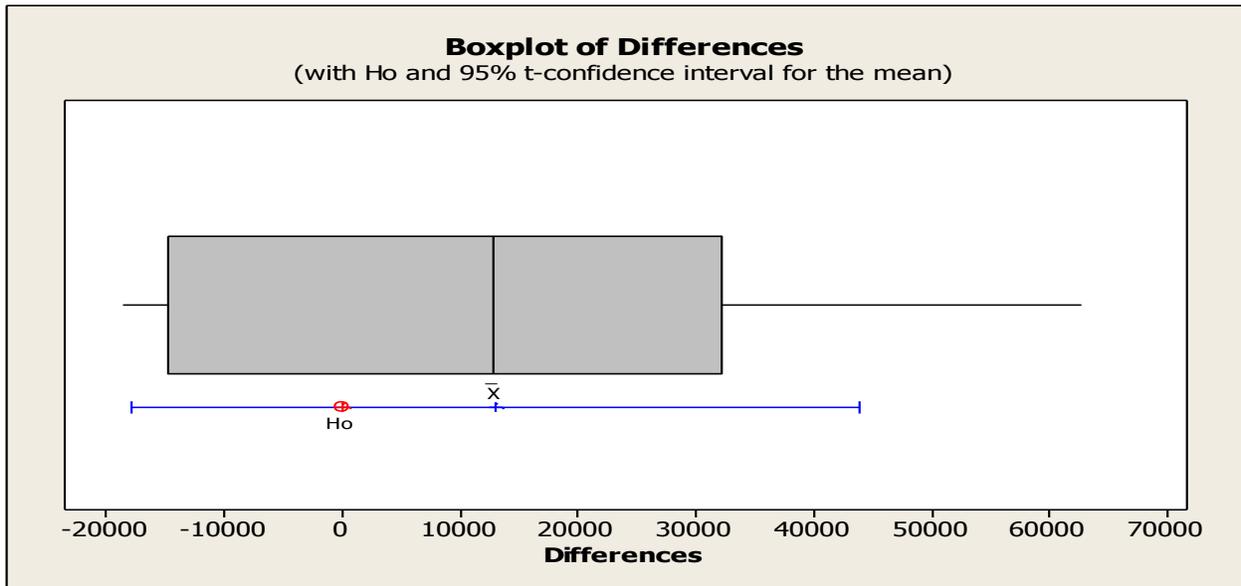


Figure 1.2 – Box Plot of differences

As per analysis, it's observer:

Annual Average Sales Before 2014 Compare to Annual Average Sales 2014 Onwards Overall Sales Increase. But still T – Value is not significant and Boxplot show negative.

Therefore, Institutional level Public Outreach Campaign has Non-Significant value.

Factors which leads towards Non Significance:

1. 1.Country Economical Condition
2. Big Buyers Purchasing Strength
3. Health Ministry Policy

4. New Infrastructure

5. Expansion of existing infrastructure

Note: Addition to this it is also observer that, controlling inventory level is also possible by knowing the schedule of customer & product.

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