Dissertation RM

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Dissertation Report

Introduction

Forecasting is the technique of estimating future events based on a study of previous and current trends. It entails computations and estimations that take into consideration historical performance, current trends, and expected changes in the near future. Forecasting is an important part of the planning process.

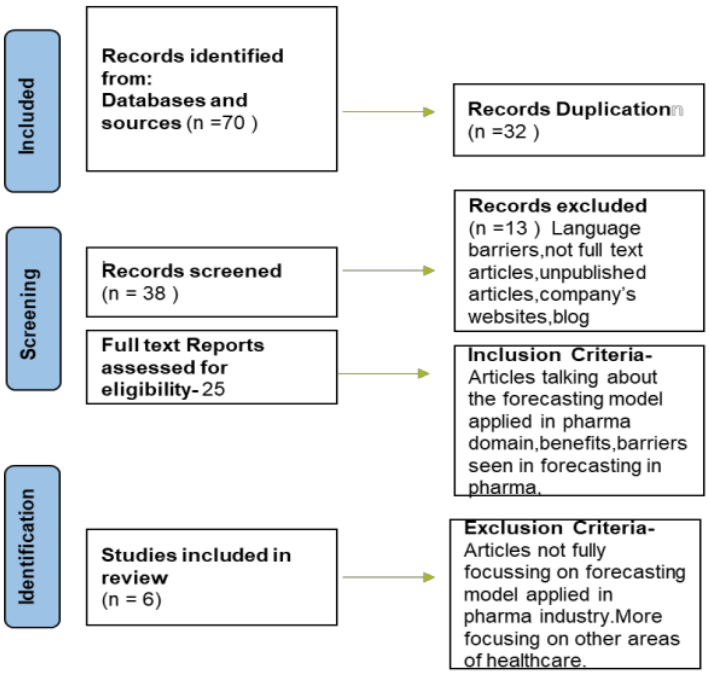
Forecasting utilizes a range of approaches, including historical parallels, survey analysis, and predictions. The global pharma markets are changing and becoming more complex on a daily basis, not just because of their size, but also because of the variety of products, companies, demography , legislation, technology, and other services available. Because the market is dynamic, it is critical for a pharmaceutical business to have a complete market analysis when entering a new market or releasing a new product. R&D sector of pharma is becoming expensive due to long clinical trials process a drug has to pass through. With an increasing number of companies and goods, the pharmacological market is expanding globally. Understanding the market dynamics of a product throughout its life cycle is critical from a business standpoint. It's been used in hospital bed allocation, disease modelling, financial planning, and workforce estimation in healthcare.

Methodology-

The study period was between 1 march 2021-10 June at PharmaAce LLP innovation pvt.ltd.The study design was Descriptive study design,secondary research done by using various Databases .The case study carried out at internship organization was presented to demonstrate the basic framework of one of the forecasting model used in Pharmaceutical domain.

Research Questions-

a) What are benefits and challenges of using forescasting techniques in Pharma industry?
b) To understand the one of forescasting technique applied in asthma therapy area at PharmaAce organization with the help of case study.



Literature Review

Study Details	Author name	Benefits? How is it used? Challenges? Knowledge Gaps?
1.Demand forecasting in pharmaceutical supply chains: A case study.	Merkuryeva,A. (2019)	Forecasting can help managers make good decisions in inventory management.Historical sales data from the manufacturer or distributor side can also be valuable for better stock management decision-making .The author did not devote serious attention to cases in which historical data is lacking.

2.Trend analysis and future market forecasting of cardiovascular drugs in Iran.	Mohammadzadeh, M., Rasuli, P., & Ghari, T. (2017).	The buying behavior for the illness area was mapped using medicine sales data analysis.Target pharma businesses can better focus on certain products and optimise their advertising campaigns as a result of this.The author concentrates on stable therapy areas with less changing environment than other diseases. Another incident that was factored in the forecasting model was the difficulty in predicting medicine sales

Study Details	Author name	Benefits? How is it used? Challenges? Knowledge Gaps?
3. Industry Drug Development Portfolio Forecasting:Productivity, Risk, Innovation, Sustainability	Vladimir Shnaydmman, (2020)	The study suggests that by focusing on each step of the drug development process in a simulator forecasting model, it may be utilised to reduce drug application review delays, forecasting for the clinical trials industry spectrum, and lowering drug rejection rates across governing agencies. Data availability has been proven to be a limiting factor in accuracy.
4.Forecasting drug utilization and expenditure in a metropolitan health region	B.wettermerck Mariepearson(2010)	The author recognized the importance of drug spending figures in estimating diagnostic accuracy and value proposition in comparison to existing drugs. The drug's acceptance trend may vary due to uncertainty in the healthcare system. Events that affect the acceptance pattern were not put into account by the model.

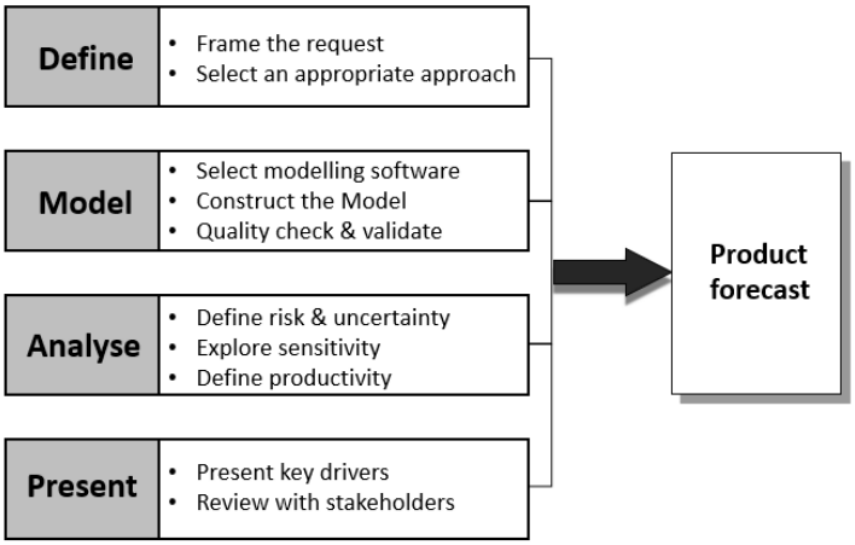
Study Details	Author name	Benefits? How is it used? Challenges? Knowledge Gaps?
5.Examining the Applicability of Market Forecasting Models to New Pharmaceutical Products	Madhu Agarwal Roger J caltone	In the drug companies, drug design product forecasting has proven to be very advantageous because it includes risk in terms of effort, money, and time to bring a new product to market. There are no market events criteria in the model evaluation, which is a crucial element in correct forecasts .
6.Statistical and Deep Learning Models for Forecasting Drug Distribution in the Brazilian Public Health System	Renan.Metal (2018)	In this study sales data of drug was collected from Iran drug list and was analysed for 15 years to understand dynamics of the market.Drug design product forecasting has proven to be quite beneficial in the healthcare industry since it accounts for risk in terms of effort, money, and time spent bringing a brand to life. The model evaluation does not include any market happenings parameters, which is an important component of precise planning.

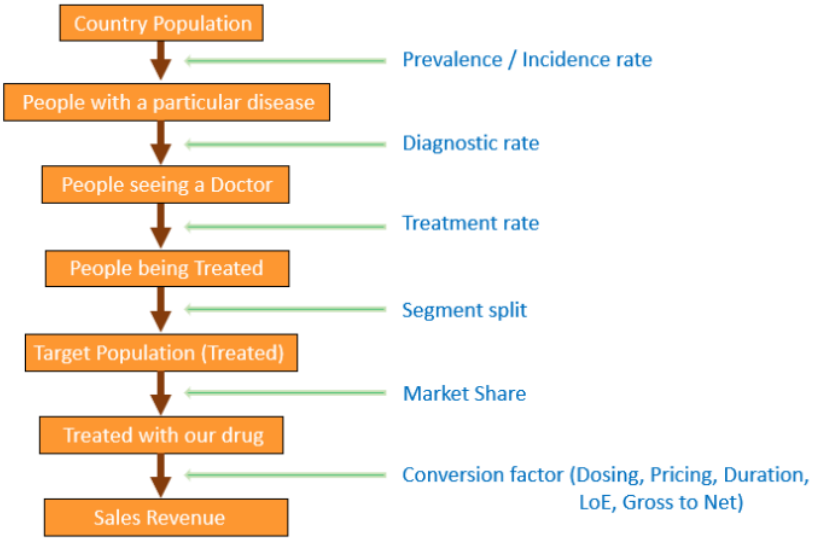
Case Study

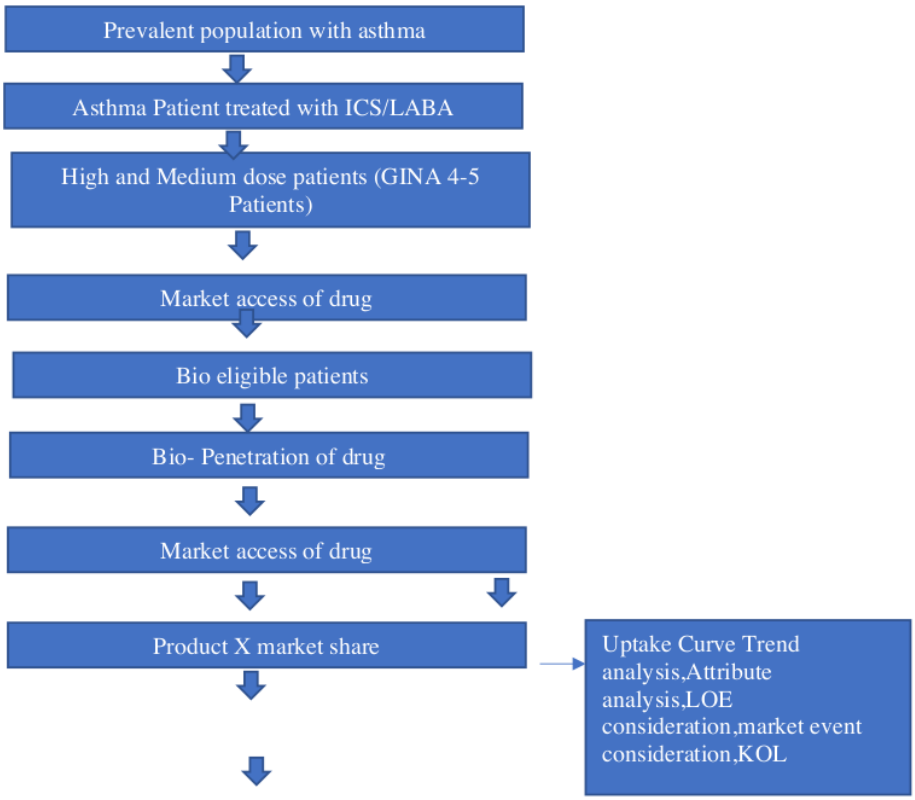
Company Z is planning to launch a novel biologic drug product X in Asthma market in some countries. On the basis of attribute analysis on safety and efficacy of the biological drug available in the market, the Product X drug was found superior.The target Patients for our product X are Severe Asthma patients.Another products Y also going to launch in 2022 which might impact the Product X shares in the market(Considering it as one of the market event for Product shares calculation)

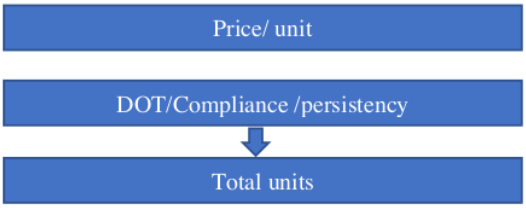
Asthma Market Overview

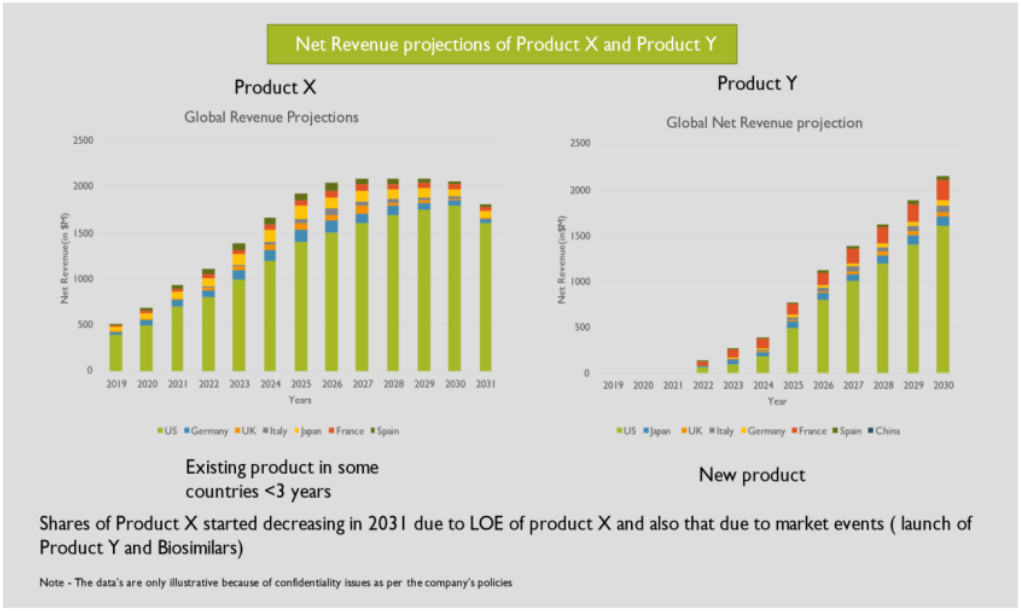
Asthma Asthma is a lung condition that is persistent and inflammatory. Asthma is a lung condition that is recurrent and inflammatory. The market for asthma therapy is predicted to be driven by rising asthma cases, better inhaler devices, biological drug innovation, rising death rates, rising pollution levels, and a growing ageing population. In addition, demand for novel biologic drugs for asthma treatment, rise in need for personalized therapies to control severe asthma. AstraZeneca, Merck & Co., Chiesi Farmaceutici, GlaxoSmithKline, Novartis AG, and F. Hoffmann-La Roche are some of the leading players in the worldwide asthma treatment industry. Cipla, Dr. Reddy's Laboratories, Actavis, Orchid Chemicals and Pharmaceuticals, Abbott, and Pfizer are among the notable firms active in the worldwide asthma treatment industry.




Country Population
Prevalence / Incidence rate
People with a particular disease
Diagnostic rate
People seeing a Doctor
Treatment rate
People being Treated
Segment split
Target Population (Treated)
Market Share
Treated with our drug
Conversion factor (Dosing, Pricing, Duration, LoE, Gross to Net)
Sales Revenue


Prevalent population with asthma
Asthma Patient treated with ICS/LABA
High and Medium dose patients (GINA 4-5 Patients)
Market access of drug
Bio eligible patients
Bio- Penetration of drug
Market access of drug
Product X market share
Uptake Curve Trend analysis,Attribute analysis,LOE consideration,market event consideration,KOL





This is kind of patient-based forecast model (Epidemiological model) wherein prevalence/incidence of disease is considered to forecast a sales/revenue of a drug going to treat people in the market in coming future. Patient-based forecasting is based on epidemiology data such as incidence or prevalence, whereas trend-based forecasting is based on past sales and prescription data. When a new product is being launched, patient-based forecasting is used, while trend-based forecasting is used when forecasting an existing product for which we have historical data. The population is taken into account in a patient-based forecast. A patient-based forecast takes into account the country's population and how many people are likely to have a certain condition (Incidence/Prevalence). Among these, it considers how many people visit a doctor for a diagnosis (Diagnostic Rate) and how many are treated (Treatment Rate). It's crucial to know the percentage of people who are targeted for a specific treatment (Segment split) and the population who are using a specific product among those who are being treated

(Market share). To compute the total patients, the treated incident patients are multiplied by the factor stating the entire length of time they stay on therapy, i.e. DoT (Duration of Treatment). Total patients are multiplied by the dose of therapy, i.e. Dosing, Pricing, and LoE, to convert patients into income (Loss of Exclusivity). The launch date for the first approved generic rival, which may occur after the branded drug's patent expires, is referred to as "loss of exclusivity."

Pharmaceutical forecasting in terms of sales revenue and volume is critical in assisting senior decision-makers in developing integrated business plans and prioritising investment in drugs that will provide the best return on investment while limiting or eliminating investment in drugs that will be a liability to the company.While developing a prediction, the business analyst has a complex and detailed task..

As a result, a pharmaceutical company must examine a number of factors before proceeding with clinical studies or launching a medicine. To gain a significant market share and profit, a company must have the proper assets with the correct pricing. As a result, a firm views each medicine as an asset. The success of the medicine will determine the company's future success .

Conclusion -

Pharmaceuticals is a large business, and forecasting plays an important part in making educated decisions by management, from R&D through logistics. Clinical forecasting and demand forecasting play an important role in the pharma industry, directing the company's marketing efforts in the appropriate direction and to the proper target audience. Our foresight is challenged by the dynamic nature and complexity of disease. Another factor to consider when forecasting on the basis of trend is data availability. Creating a forecasting model is a hard and extensive undertaking for a business analyst. As a result, before beginning to develop the model, the analyst must have a thorough understanding of the ailment, the drug under consideration, the clinical trial data, and several

other inputs. Forecasting will help companies to make better strategies and operational plans and help achieve better revenues and achieve targets. Pharmaceutical forecasting in terms of sales revenue and volume is critical in assisting senior decision-makers in developing integrated business plans and prioritising investment in drugs that will provide the best return on investment while limiting or eliminating investment in drugs that will be a liability to the company.

Recommmendation

1. Patient based forecasting should be used for the product which is completely new and comes under rare disease, one should go for trend based forecasting with historical data availability for atleast 3-4 years.There should be inclusion of market events in the model for better accuracy of forecast.
2. One should combine one or two types of forecasting model for validation of data from various sources for better accuracy of forecast.
3. Training should be given in this area to produce skill workforce so that they can act as a bridge between analytics and pharma subject matter expert to solve problem which add up value in decision making in various processes in Pharma industry

Discussion

In this study, we found that effective forecasting in the pharmaceutical industry is not only helpful to the company's bottom line, but it is also related to people's concerns about drug shortages in emergency situations. Projecting supplies in hospitals and the public health industry also demonstrates how forecasting supplies can assist better allocate resources and ensure optimal healthcare delivery.But for better accuracy of forecast we can make our assumptions so strong keeping in mind the real scenario in the current market ,this will help the companies to understand the dynamicity of the market and they can better realize their product market potential .

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