“FINANCIAL STATEMENT FRAUD DETECTION WITH THE BENEISH MODEL: AN EMPIRICAL STUDY OF SELECTED PHARMACEUTICAL COMPANIES IN INDIA”

A THESIS

SUBMITTED BY

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DECLARATION BY THE CANDIDATE

I declare that the thesis entitled "**FINANCIAL STATEMENT FRAUD DETECTION WITH THE BENEISH MODEL: AN EMPIRICAL STUDY OF LISTED PHARMACEUTICAL COMPANIES IN INDIA**" submitted by me for the degree of Master of Commerce is the record of research work carried out by me during the period from December 2023 to April 2024 under the guidance of **DR. ALPA JOSHI** and I assert that the statement made and conclusion drawn are an outcome of my independent, legitimate and original research work. I further certify the work has not formed the basis for the award of any degree, diploma, associate ship, and fellowship, certificate in any other University or other institution of higher learning.

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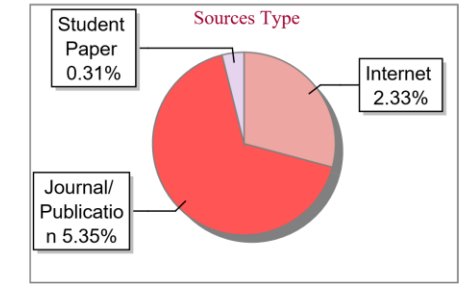

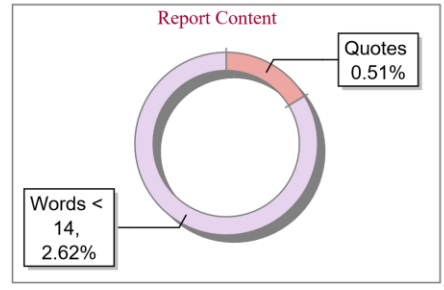

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Date:

Place: Rajkot **NIRAV PRAFULBHAI VAGHELA**

PREFACE

First, the introduction gives background information on financial statement fraud, outlining its incidence, consequences, and ramifications for different stakeholders, including the general public, investors, and regulators. It emphasises how crucial it is to identify and stop this kind of fraud in order to preserve the integrity and openness of the financial markets. The Beneish Model, a statistical model created by Professor Messod Beneish to identify financial statement fraud or earnings manipulation, is then introduced in the preamble. It highlights the applicability and efficacy of the model in detecting false financial reporting by providing a brief explanation of its main elements and indicators.

The preamble also describes the study's specific objective, which is to apply the Beneish Model to an analysis of listed pharmaceutical companies in India. It provides an explanation of why this specific industry was chosen, mentioning things like the industry's importance to the Indian economy, the regulatory framework, and previous examples of financial malfeasance in the field.

A summary of the research methods used in the study is also given in the preface. The process of gathering data is covered, along with the sources of financial data and other pertinent information needed for analysis. It also describes the statistical methods and analytical instruments used to apply the Beneish Model and evaluate the probability of financial statement fraud in the pharmaceutical companies that were sampled.

The introduction not only outlines the research methodology but also notes any restrictions or difficulties that arose during the investigation. In addition to acknowledging the inherent limits of statistical models like the Beneish Model and the difficulty of detecting financial fraud, it also emphasises the significance of doing thorough analysis and result interpretation.

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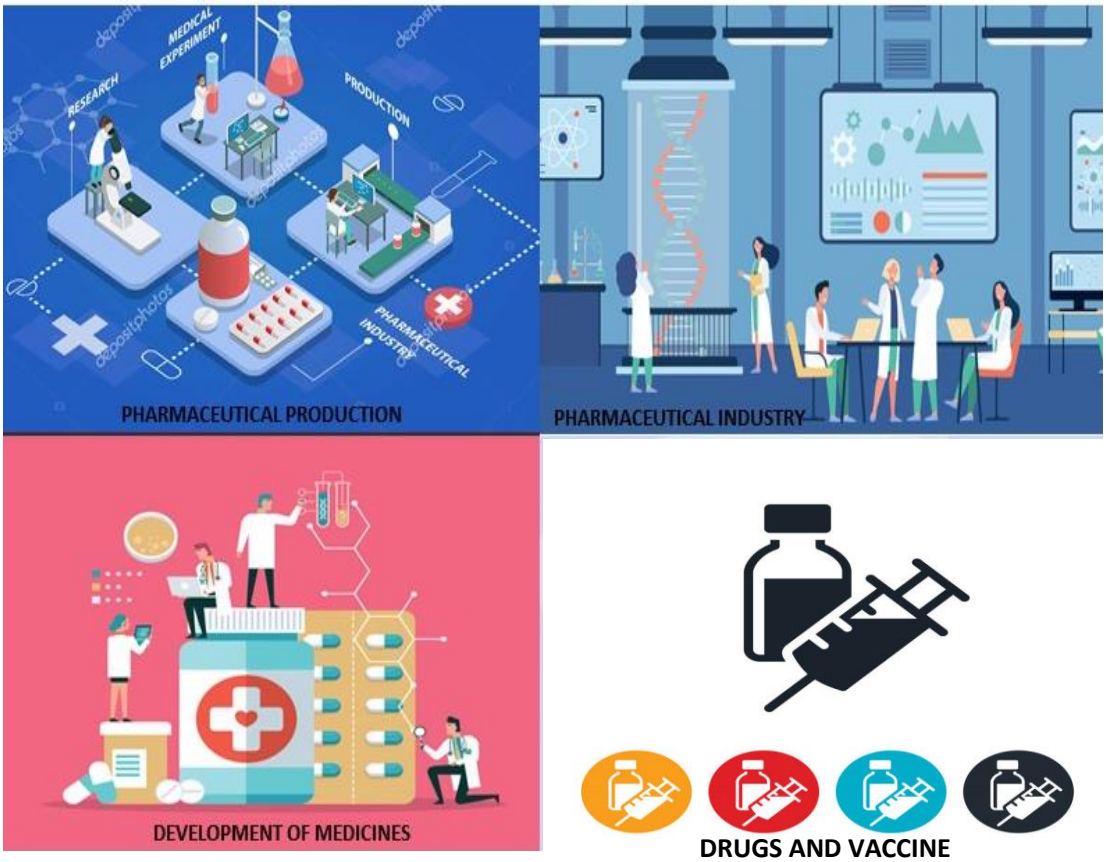
INTRODUCTION OF THE PHARMACEUTICAL INDUSTRY



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1.1 INTRODUCTION

An "industry" is generally defined as a particular class of economic activity that includes the manufacturing of commodities or the rendering of services. Businesses, organizations, and corporations that participate in comparable activities and generate comparable goods and services are frequently what define an industry. These activities are typically categorized according to shared characteristics, like the kind of goods or services provided, the methods used in production, and the markets they target.

The pharmaceutical sector finds, develops, produces, and distributes pharmaceutical medications. The pharmaceutical sector is currently growing at a very quick speed.

The government has rigorously monitored the public health since everyone is worried about it.

pharmaceutical sector. Specifically named as an engine of economic growth in the UN Millennium Development Goals is the pharmaceutical industry. Economic development is thought to have an impact on health as well as being a cause of it. This sector of the economy is the most technologically advanced and capital-intensive. The "lifeline" industry gets its name from the fact that its products are vital to lessening the agony of the sick. Any economy may be made much healthier by creating millions of employment and increasing export earnings. This sector of the economy is notable for producing distinctive goods that.

India's pharmaceutical industry has attractive investment prospects and contributes significantly to exports. A significant portion of the global population obtains inexpensive generic medications from an Asian nation that also manages multiple.

facilities that adhere to World Health Organization (WHO) and US Food and Drug Administration (USFDA) Good Manufacturing Practice (GMP) requirements. India comes in at number three for volume and fourteenth overall for usefulness. Due to their lower prices, Indian pharmaceutical items are becoming more and more popular in international markets, which could explain this trend. India will therefore export its pharmaceutical products all over the world, earning it the nickname "pharmacy of the world."

Over the last five decades, Indian pharmaceutical companies have thrived by satisfying home markets and securing the top spot in the world's prescription medicine market.

Owing to a range of product categories, such as vaccinations, generic medications, and other items, the Indian

Compared to 5% in India and 95% worldwide in 1969, pharmaceutical companies now control 85% of the Indian market and 15% of the global market in 2020.

The Development and Assessment of Novel Medications

The process of taking a new medication from "bench to bedside" is known as drug development. The process of designing, developing, and getting a medicine licensed for use in patients can take ten to fifteen years.

1.2 PHASES IN THE CREATION OF A SUBSTANCE

- **Early Stages of Drug Discovery**

  During the drug development process, a number of fundamental "steps" are completed. In order to find and improve pharmacological molecules that can have an impact on a particular biological target linked to a disease, academic and industrial scientists collaborate to identify possible drug-capable targets for that disease. Currently, in vitro and animal models are used in the lab for this type of work.

- **Clinical Preclinical Investigations**

  Prior to testing a medication candidate on humans, preclinical research is intended to provide crucial information regarding the drug's safety and efficacy. Usually, models that demonstrate a candidate's biological impact are both in vitro and in vivo. In order to proceed to clinical development, regulatory bodies like the FDA and MHRA mandate preclinical research prior to the submission of an investigational new drug application (IND).

1.3 APPLICATION FOR INVESTIGATIVE NEW DRUG

1) **Examiner**

   The doctor who is in charge of starting and conducting the investigation submits this. The investigational medication will be administered and/or dispensed under the supervision of the same physician. Usually, research on an unapproved medication, an approved medication used for a non-licensed use, or a distinct patient population is the reason for this kind of application request.

2) **use in an emergency**

A last-minute application Without having to file an IND in line with 21 CFR, Sec. 312.23 or Sec. 312.20, an IND allows the regulator (FDA) to approve the use of an investigational medicine in an emergency. Patients who don't fit the requirements for current clinical studies or in circumstances where there isn't a real recognized clinical procedure are candidates for this kind of application.

3) **Intervention**

When the last clinical work is finished and the new drug application is being examined by the FDA, this kind of IND application is filed to obtain access to an investigational medicine that has demonstrated promise in clinical trials for treating a serious or life-threatening ailment.

4) **Medical Examinations**

Clinical studies are intended to provide answers to particular queries concerning an experimental medication. A study protocol, which outlines the specifics of the clinical trial's conduct, must be adhered to by the studies. In order to guarantee participant safety and the accuracy of the data gathered for the study, it includes important study objectives, study design, and statistical concerns.

5) **Regulation Examining**

Evaluation of Regulations, In the USA, submitting an application for marketing permission is referred to as a new drug application (NDA). This identical procedure is known as a Marketing Authorization Application (MAA) in the European Union and other nations.

1.4 WHAT DOES INDUSTRY MEAN?

A collection of producers or companies that deal with a specific type of product or service is called an industry. Cloth is designed, made, and sold by workers in the textile industry. All of the tourism's commercial facets are included in the tourist industry.

1.5 WHAT DO PHARMACEUTICALS MEAN?

Anything that is used medicinally, such as cough syrup or sleeping pills, is considered a pharmaceutical.

1.6 THEPHARMACEUTICALINUDSTRY. WHAT IS IT?

The development, manufacture, and discovery of new medicines are considered to be the main activities of the pharmaceutical industry. It is pervasive and involves government engagement, chemicals, research, and regulations. Nevertheless, geographical variations in the traits of the One can observe the pharmaceutical industry. The pharmaceutical sector advances cutting-edge scientific and technological developments to address the population's complicated healthcare needs, which are crucial part in the creation of vaccinations and medications to treat a range of illnesses, This improves people's quality of life.

1.7 BRIEF HISTORY OF MEDICINES

Among human civilization's greatest treasures and benefits is without a doubt the discovery of medicine. From prehistoric times to the present, the history of medicine reveals an amazing journey of how people have dealt with various illnesses and disorders. India, China, Egypt, and Babylonia are the origins of several ancient medical customs. The history of the use of plants as a therapeutic agent is, however, not well documented. It is thought, however, that early humans employed medicinal plants as therapeutic agents based on ancient artwork found all over the world.

In this section, we'll look at the development of medicine, the history of physicians, and the earliest known medication.

- **Ancient Medicine**

Early humans had no idea about the different illnesses and the drugs that treated them. The therapeutic properties of plants and herbs were discovered by early people through trial and error. They treated constipation and the common cold with different herbs, viewing them as normal aspects of human life. The mysterious illnesses were thought to be caused by spells or other supernatural forces. It's a widely held assumption that the first doctors were magicians and sorcerers.

Prehistoric medicine relied heavily on religious prayers and magic. People in ancient Mesopotamia were unable to discriminate between medicine and magic.

Additionally, if a sick individual visited a doctor, the physicians would recommend both medication and the recitation of magical words. Diagnosis, physical tests, and therapies were used in antiquity by the Babylonians and Egyptians. The ancient Egyptians were thought to have the best health and a remarkable healthcare system.

- **Traditional Medicine in India,**

Indian medicine, which used natural remedies, was highly developed. The early iron age Atharvaveda provides insight into the use of herbs and other medicinal plants by prehistoric Indians as remedies for various diseases.

India's medical history is seen as having reached its peak between 800 and 1000 BCE, when the physician Chakra and the surgeon Sushruta introduced medical treatises. Since Hindus were forbidden from cutting up dead bodies, there was very little anatomy knowledge in ancient India. When diagnosing illnesses, Indian doctors employed all five senses. It was once believed that the Indians could identify between 700 and 800 different types of medicinal herbs. They had a reputation for utilizing animal parts as well.

1.8 KEY CONTRIBUTORS IN MEDICINE AND PHARMACY

- **Acharya Charak**

Acharya Charak, born in 300 BC, is known as the Father of Indian Medicine. He was one of the essential contributors to the Ayurvedic system developed in ancient India. He is the author of 'Smahita Charaak, considered the Ayurvedic cyclopaedia. He also attempted to list the names of all 360 plants and animals then known to science.

- **Sushruta**

Sushruta is also considered the 'Father of Indian medicine' and 'Father of Surgeries' as he performed complicated facial plastic surgeries. He also did surgeries in dentistry, ophthalmology, obstetrics and gynaecology, back in the year 2 BC when microscopies, scanning machines weren't even invented. In his book "Suhrutha Samhith", Sushruta wrote down his observation of more than 1000 plant medicines on his various patients and their reactions

- **Sir Ram Nath Chopra**

  Sir Ram Nath Chopra, born on 17th August 1882, was an Indian Medical Service officer and the most respected person in India's science and medicine field. His excellence in pharmaceuticals and his aim of making India self-sufficient in producing drugs earned him the honour of 'Father of Indian Pharmacology'

1.9 FATHER OF PHARMACY IN INDIA

Mahadeva Lal Schroff, the founder of Indian pharmacy, was born in Darbhanga, Bihar, on March 6, 1902. Despite lacking any training in pharmacy, he spearheaded the advancement of pharmaceutical education and the pharmaceutical industry in India.

In 1932, while serving as a professor at Banaras Hindu University (BHU), Schroff had the brilliant notion to establish the first-ever independent department of pharmaceutical sciences in India. He began by outlining Pharmaceutical Chemistry as the main topic of the B.Sc. program. After that, he suggested a two-year integrated B.Sc. program that included pharmacy, pharmacognosy, and pharmacology. This was two years later. Later, it was expanded to become the first-ever three-year Pharm program in India at BHU.

In 1935 Professor Schroff established the United Provinces Pharma Association with branches globally. He soon gained the confidence and liking of the top intellectuals, scientists and industrialists, pharmacology and medical practitioners. He successfully created awareness of this science to develop pharmaceutical education of science and technology in India.

1.10 POST-INDEPENDENCE ERA OF THE PHARMA INDUSTRY

Since independence, the Indian pharmaceutical sector has grown through several stages. The Patents and Design Act of 1911, which included patents for both products and processes, was in effect until 1972.was accepted in all sectors, including the pharmaceutical and drug companies.But this Act mostly acted as a barrier to the expansion of domestic pharmaceutical and medication industries. MNCs utilized it as a tool, on the one hand.to limit the production of medications that were developed elsewhere Mueller (2007) said. However, the multinational corporations themselves were not Interested in conducting pharmaceutical production in India asthey mostly limited themselves to formulating activities by importing the majority of the pharmacological compounds that are active (APIs).

and starting manufacturing at the penultimate stage [Chapter 5 of the Fifth FYP (Five-Year Plan)]8 which needed a comparatively small investment. Additionally, considering the ban

Indian pharmaceutical enterprises were involved in the manufacturing of formulations. unwilling to invest in the production of large quantities of medications because it a significant investment because of how capital-intensive it is. of this sector. Due to the intense efforts of the administration of

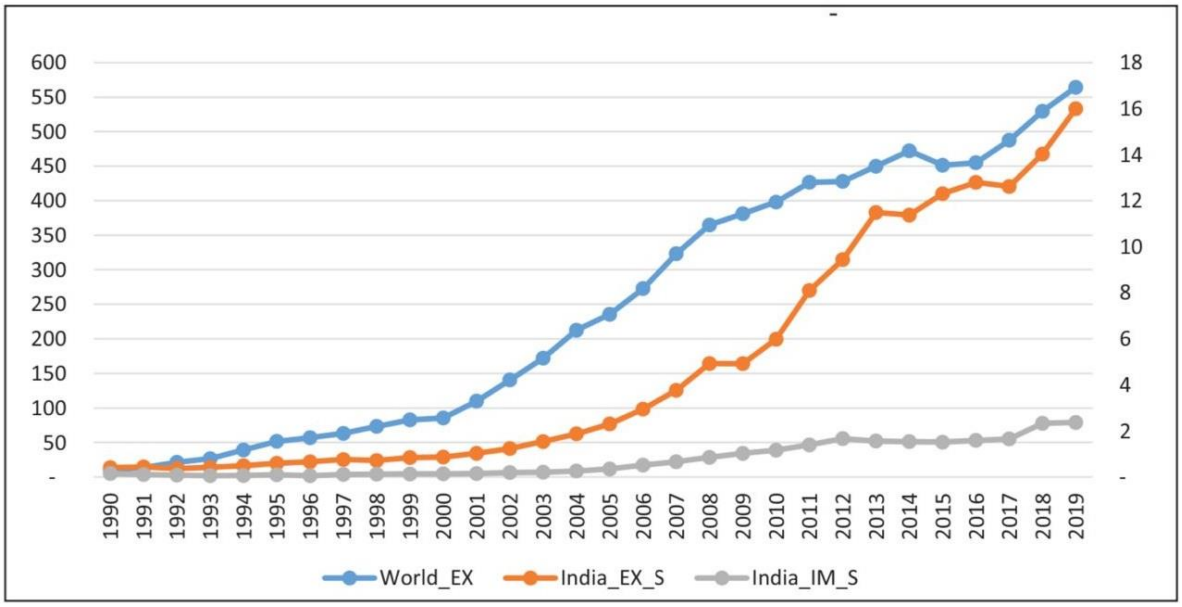
Basic medication manufacturing capacity in India (GOI) [Hindustan Antibiotics]1954 saw the establishment of Indian Drugs and Pharmaceutical Limited (HAL) and(IDPL) in 1961] was created for a few essential bulk medications, namely Penicillin. Ampicillin, 6-APA, and streptomycin sulfate, among others.

Furthermore, Zambad and Londhe (2014) note that between 1947 and 1957 in India, multinational corporations (MNCs) controlled over 99 percent of the patents and 80 percent of the market concentration, indicating no competition, assurance of return on investment, and the protected environment provided by product patents; however, these factors hardly helped the Indian drugs and pharmaceutical industry in boosting R&D and attracting Foreign Direct Investment (FDI), technology, and innovation (Mueller, 2007). However, they unexpectedly helped the MNCs charge comparatively high prices10 for the majority of the pharmaceuticals.

Due to historical difficulties, the Indian pharmaceutical industry has become overly dependent on multinational corporations (MNCs) to meet its domestic needs for both formulation and bulk pharmaceuticals. The substantial import values of formulations and the trade imbalance brought about by reduced exports of formulations serve as examples of this dependency.

Formulations were valued at $12 million in 1966 and over $18 million in 1972 when they were imported. Formulation exports were substantially lower than imports, leading to a trade deficit. This highlights how underdeveloped the Indian pharmaceutical sector is and how dependent it is on imports of pharmaceuticals. The Indian pharmaceutical sector is a major player in the global pharmaceutical market and has advanced significantly in recent years.

Figure1.1 From 1966 to 1990, India's share of global exports (%) and its global trade in formulations (USD)



(Source: Authors' estimation using WITS5 , World Bank online database)

Based on value, the countries that account for the majority of the world's formulation exports—together accounting for over 56% of the total—are Germany (15.3%), Switzerland (14.6%), Ireland (9.3%), Belgium (9%), and the United States of America [USA] (8.3%) (Table 1). However, the biggest nations are ranked in declining order according to volume, with Germany placing first at 13.8%, followed by France at 8.9%, China at 8%, India at 5.1%, Italy at 5.1%, and so on. In 1996, the United Kingdom and France were major contributors to global formulation exports, both in terms of volume and value. However, in 2019, their proportion of these exports significantly decreased. Ireland (7.2%) was another significant exporting nation that had a decrease in its proportion in 1996 compared to overall export volume. Furthermore, it is important to remember that although India's part of global formulation exports has consistently increased in volume since 1996, its share in terms of value has only increased since 2005.

The price at which the nations supply pharmaceutical items to the global economy is also reflected in the disparity between their respective share in terms of volume and value of exports. For example, since 1996, Switzerland has been a world provider of expensive pharmaceuticals.

Likewise, the United States, the Netherlands, Belgium, and Ireland were among the other nations that exported pharmaceuticals at a premium in 2019. However, since 1996, China and India have been providing the globe with comparatively inexpensive pharmaceuticals, as seen by the notable disparities in their market shares with respect to both volume and value. China and India's shares in 2019 were 1.2% and 2.8%, respectively, in terms of value, while their respective shares in terms of volume were 8% and 5.1%. Furthermore, when comparing the aggregate prices of these two nations, China appears to be more competitive, which amply illustrates the strong efforts being made by the Chinese government and pharmaceutical industry to strengthen China's standing in the global market.

1.11 A SECTOR OF THE HEALTHCARE INDUSTRY IS PHARMA.

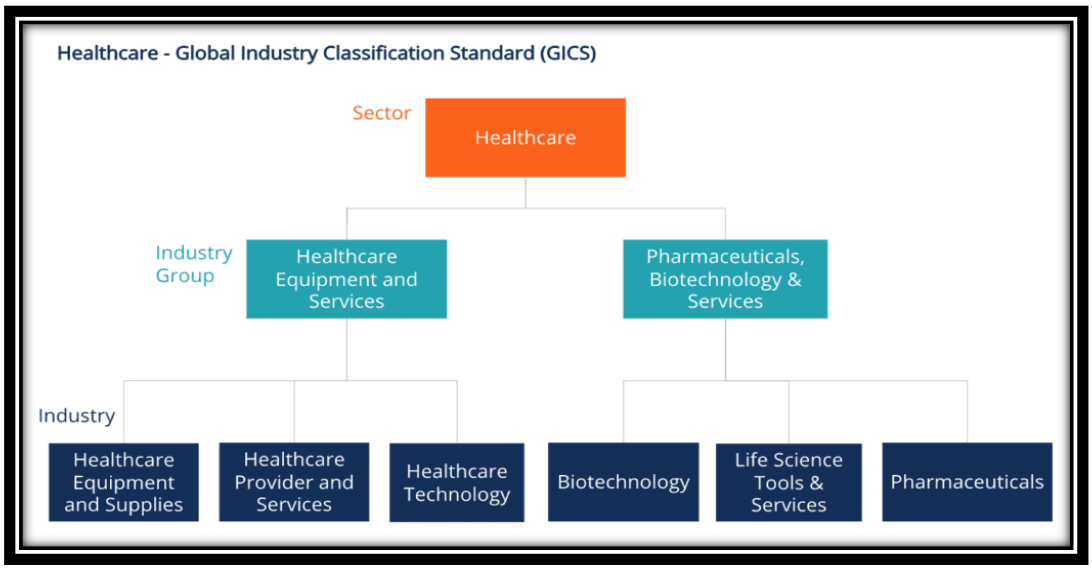
Healthcare Industry

The healthcare industry (also called the medical industry or health economy) is an aggregation and integration of sectors within the economic system that provides goods and services to treat patients with curative, preventive, rehabilitative, and palliative care. It encompasses the creation and commercialization of products and services conducive to the preservation and restoration of well-being. The contemporary healthcare sector comprises three fundamental facets, namely services, products, and finance. It can be further subdivided into numerous sectors and categories and relies on interdisciplinary teams of highly skilled professionals and paraprofessionals to address the healthcare requirements of both individuals and communities. One of the biggest and fastest-growing sectors in the world economy is the healthcare sector. Health care can play a major role in a nation's economy, accounting for over 10% of GDP in the majority of wealthy countries. In 2021, U.S. healthcare spending increased by 2.7% to reach $4.3 trillion, or $12,914 per person. Health spending was 18.3 percent of the country's Gross Domestic Product. From a few hundred dollars annually in the 1970s to an average of $4000 annually in current purchasing power parities, the per capita spending on health and medicines in OECD countries has increased significantly.

The following are the main departments of the healthcare industry:

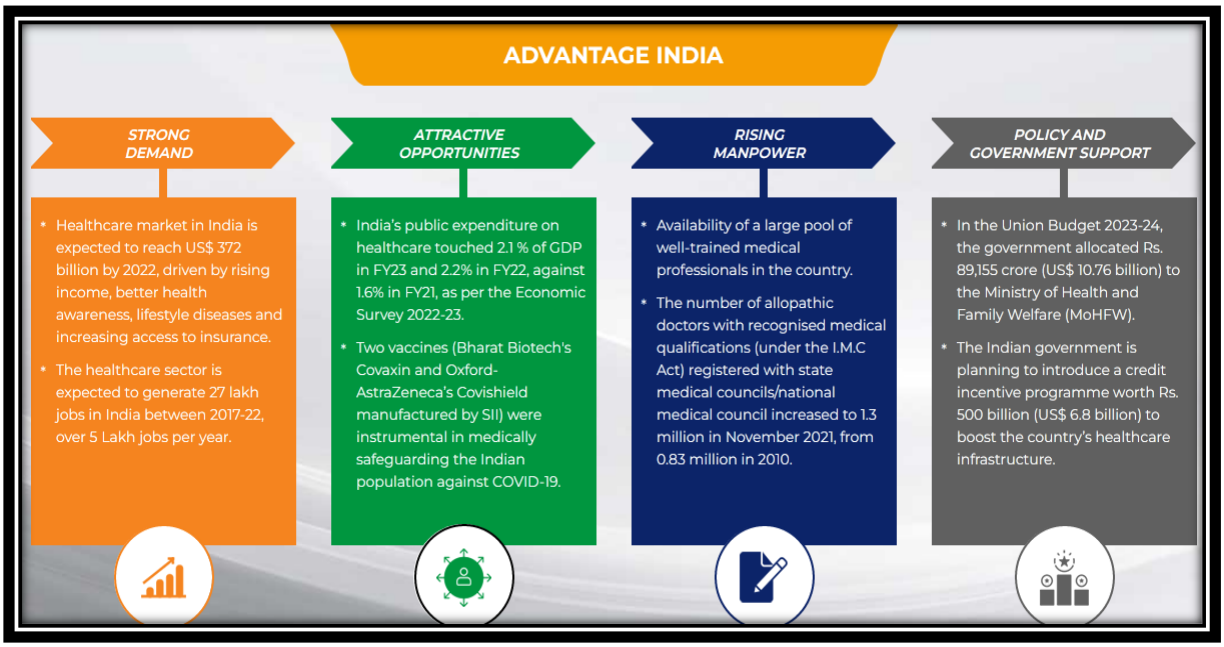
1. Healthcare services and facilities
2. Medical devices, equipment, and hospital supplies manufacturers
3. Medical insurance, medical services, and managed car
4. Pharmaceuticals & Related Segments

Figure 1.2 Pharma Industry- Part Of the Healthcare Industry



(Source: https://corporatefinanceinstitute.com)

Figure 1.3 Current Scenario Of India's Healthcare Industry



(Source: https://www.ibef.org)

1.12 TYPES OF PHARMACEUTICAL COMPANIES

A diverse industry, pharmaceutical businesses deal in prescription pharmaceuticals, medical equipment, surgical supplies, and other items associated with healthcare services. Development, research, production, distribution, marketing, retailing, disbursing, and much more are all part of the business.

For the treatment and management of disease, drugs are essential to healthcare. Many procedures are involved in the development of drugs. Numerous varieties of pharmaceutical corporations and pharma franchises exist, contingent upon the operations of the facility.

Some of the broad categories of pharmaceutical companies are:

- **Brand Developers**

  These are giant healthcare companies like Pfizer. These companies have different departments, each dealing with a particular medicine or disease. Brand developers are of three types:

  a. Formulation manufacturers
  b. API manufacturers
  c. Contract manufacturing organizations (CMO)

- **Generic Competition**

  Generic copies of a certain trademarked medication are produced by several pharmaceutical firms. Though the items do not pass the high costs of research and development, generic medications can be purchased for less money.

- **Research & Development**

  A crucial component of producing medications is research and development. It is important for both big and small businesses. Conducting trials to identify the features of diseases is the goal of research and development. minus this important step. Disease detection and treatment would not be feasible.

1.13 Now for the key categories of pharmaceutical companies

- **Pharma Manufacturing**

  A firm that involves the production of drugs is called pharma manufacturing. Marketing, modifying, and finishing of pharmaceuticals are also done by the

manufacturing unit. Included in the pharmaceutical manufacturing unit are packaging, decoration, and medication labelling.

- **Pharma Marketing**

  One of the two approaches to begin pharma marketing is to establish a pharma marketing firm or a pharma franchise distribution unit. These two business avenues are lucrative and appealing.

- **Pharma Distribution**

  Pharma distribution can be divided into numerous subcategories, including distributor, carry and forward (C&F), wholesaler, stockiest, and sub-stockiest. The PCD pharma distributor serves as the intermediary between pharmaceutical firms and retail pharmacies in this industry. It is the most popular stream since it can be used by both new and existing enterprises.

- **Pharma Retail**

  Pharma retail comprises establishments such as drug and medical stores, pharmacy shops, and chemist shops, among others. The idea of e-pharmacy is very well-liked nowadays. It belongs to the retail business sector.

1.14 TYPES OF PHARMACEUTICAL PRODUCTS

Prominent medications derived from plant sources including human blood plasma fractions, antibiotics, steroid hormones, and vaccinations. Vitamins were formerly made in nature, but these days they are mostly produced in labs. Specialized pharmaceutical firms produce a variety of medicinal formulations. In addition, distinct injectables, additives, and active components are used in various formulations. Here are some examples of the most common product categories that pharmaceutical businesses focus on.

- Parenteral Formulations
- Topical Medicines
- Oral drugs
- Novel Drug Formulations
- Oncological Formulations
- Modified Release Formulations

1.15 WHY ARE PHARMACEUTICAL COMPAINES SO IMPORTANAT?

For thousands of years, pharmaceuticals have been utilized to treat medical conditions. In the early days of medicine, a wide range of illnesses and traumas were treated with plants and herbal remedies. Today, a multibillion dollar global business exists around the drawn-out and difficult process of proving a compound's safety and effectiveness and getting it from the laboratory into the hands of people in need.

Pharmaceutical businesses are always looking for novel, cutting-edge ways to help people live better, longer lives. Pharmaceutical corporations are constantly developing, producing, marketing, and distributing these cures all over the world. The following highlights some of the industry's major accomplishments and explains the significance of pharmaceutical companies to patients, society, and the life sciences sector:

- **Treatments increase life expectancy**

  Globally, the life expectancy of men and women has increased significantly due in large part to the pharmaceutical business. Research from 30 high- and developing-income nations between 2000 and 2009 indicates that advances in pharmaceuticals contributed 73% of the overall rise in life expectancy. The average life expectancy in the world now is 72 years, up from just 32 years in 1900. This is mostly due to gains in medical science.

  With average life expectancies of 85 years old, Japan and Hong Kong have the highest life expectancy rates. Global disparity in life expectancy is beginning to decline as a result of pharmaceutical innovation, which has also helped underdeveloped countries. Richer nations have profited from this as well.

- **The industry strives to eradicate and eliminate diseases**

  The ultimate goal of treating a disease is to eradicate it because doing so improves ecosystems worldwide. The World Health Organization (WHO) currently declares smallpox to be the first and only illness in humans to be completely eradicated worldwide.

  Seven illnesses, including guinea worm, polio, rubella, measles, and lymphatic filariasis (elephantiasis), are virtually extinct. Since eradication calls for a

vaccination and a concerted worldwide effort, it is incredibly difficult to accomplish.

- **Reduced pain and suffering**

  Pharmacies can be used to manage pain, symptoms, or side effects of other therapies, which can assist relieve discomfort even though many of them do not directly treat illnesses. In comparison to people without pain, those who have chronic pain are twice as likely to experience difficulties at work, have anxiety and depression, and are four times more likely to experience depression. Pharmaceutical firms may enhance patients' quality of life and provide them the opportunity to lead healthier, more fulfilling lives by developing therapies to control pain, symptoms, and side effects.

- **Vaccines save money**

  Vaccines save money in addition to helping to save millions of lives by preventing disease. Most people agree that vaccinations are an affordable public health measure that can lower healthcare costs, avoid lost productivity, and lessen overall economic effects. As per the World Health Organization, the United States can avoid nearly $10 in medical expenses for every $1 spent on kid vaccines.

- **Hospital stays are shorter**

  Fifty years ago, the typical hospital stay in the United States was eight days. Patients may heal more faster with innovation and easier access to medical care. Nowadays, medications can be used to treat a wide range of illnesses that once required invasive procedures and therapies. In the US nowadays, a hospital stay typically lasts only four to five days. Patients are able to leave the hospital more quickly, which eases the burden on the medical staff and the healthcare system.

- **The industry employees millions of people**

  Millions of employment worldwide are produced by pharmaceutical industries. Over 800,000 professionals are employed by the biopharmaceutical business in the United States, where they operate in a variety of capacities such as scientific research, technical assistance, and production.

  It is estimated that the industry supports around 4.7 million employment in the US both directly and indirectly. Highly qualified and educated workers are needed by pharmaceutical corporations for administrative positions up to and including Ph.D. scientists.

- **Pharmaceutical companies boost the global economy**

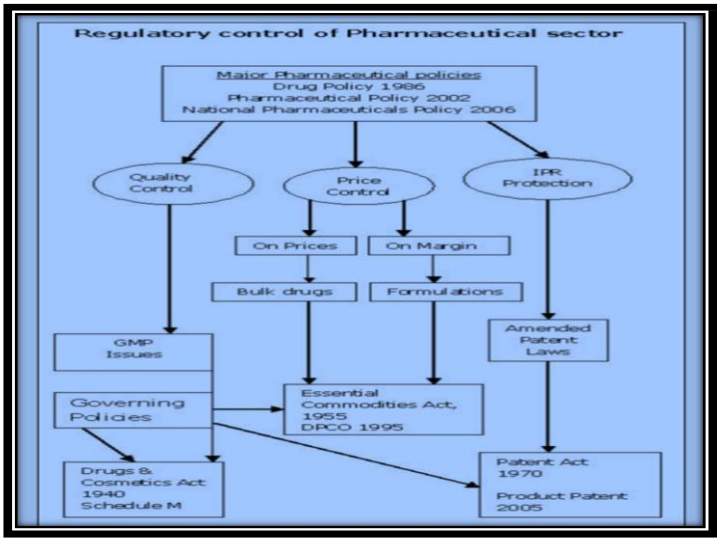
  The pharmaceutical sector is a vital contributor to the global economy in addition to advancing medical science through the discovery, development, and introduction of novel medications that enhance health and quality of life for people everywhere. At a projected value of $1.3 trillion, the sector achieved previously unheard-of heights in 2019.

  Significant economic effects are generated by the industry's research and development (R&D) enterprise. Biopharmaceutical companies in the US invest more in R&D than any other manufacturing sector, more than six times the average investment made by all manufacturing sectors. This spending is done in relation to sales.

1.16 GOVERNING BODY OF THE PHARMA INDUSTRY

A regulatory framework is necessary to ensure that users receive trustworthy and accurate information. Within this industry are many regulatory bodies that manage patents, quality, safety, and cost of pharmaceuticals. Laws are passed by government entities through regulations. They are important because they draw limits around what is and is not appropriate in the corporate world. The goal of pharmaceutical regulation is to provide patient access to high-quality, safe, and effective medications. Rules need to be in place for both new items and those that are already available on the market to improve people's health.

Figure 1.4 Regulatory Body In Pharma Sector



(Source: https://cuts-ccier.org/)

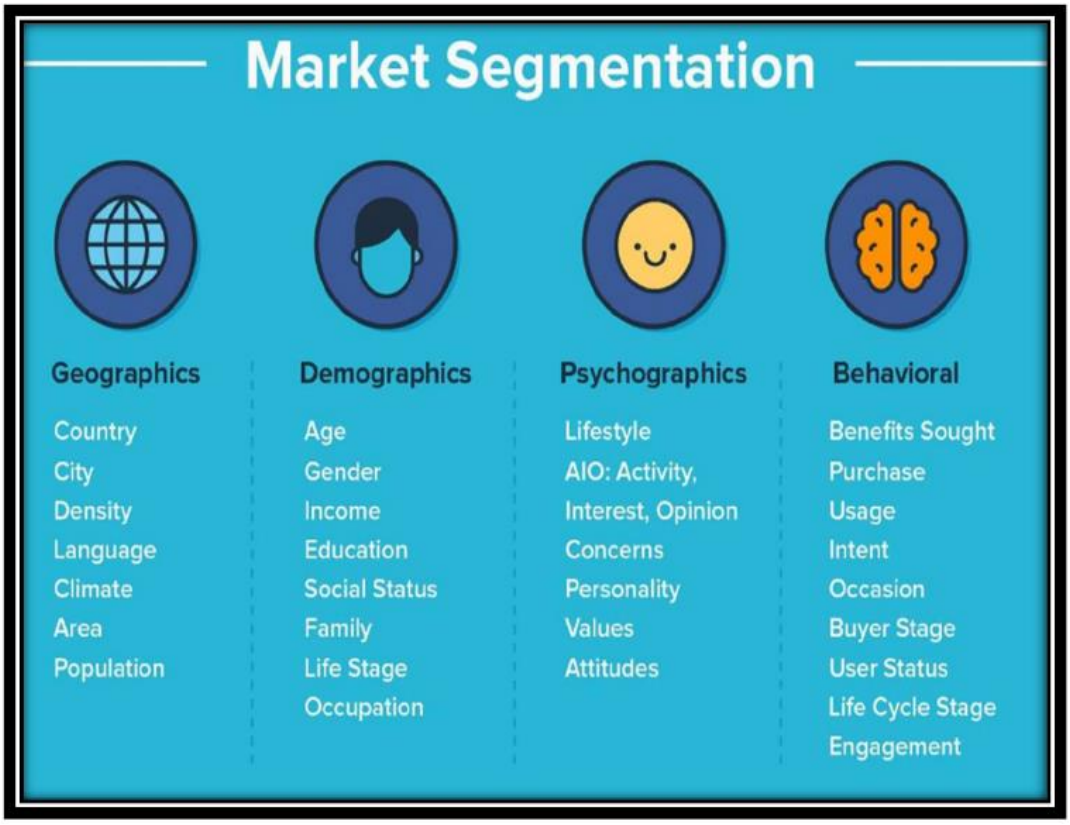
1.17 THE PHARMACEUTICAL MARKET SEGMENTATION

A pharmaceutical organization will rarely be big enough to service the whole market or be able to reach every member of the target audience with a single message, regardless of where the target audience falls in the B2B or B2C spectrum, with patients, HCPs, or further down the supply chain.

According to Rita E. Numer of on Eyeforpharma, these kinds of organizations have three challenges: determining unmet clinical requirements for more specific groups, creating products to address those needs, and concentrating marketing efforts to support successful commercialization.

From a marketing standpoint, interactions between pharmaceutical companies and their clients/customers are becoming more frequent and intense. adding even more support to the argument for the market segmentation strategy that this piece presents.

Figure 1.5 Segments of the Pharmaceutical Market



(Source: https://www.orientation.agency/)

1.18 MARKET SIZE

The Indian Economic Survey 2021 projects that throughout the next ten years, the domestic market will grow at a rate that is three times faster. The pharmaceutical sector in India supplies almost half of the global demand for different vaccines, 40% of the US market for generic drugs, and 25% of the UK market for all medications. Ten thousand manufacturing sites and three thousand pharmaceutical companies make up the country's pharmaceutical sector. As of 2021, the pharmaceutical market in India was valued at $42 billion. It is projected to increase to $65 billion by 2024 and reach US $120-130 billion by 2030.

India's biotechnology sector includes biopharmaceuticals, bioservices, bioindustry, bio-agriculture, and bioinformatics. It is projected that the Indian biotechnology market will grow from $70.2 billion in 2020 to $150 billion by 2025.

In FY20, the Indian medical device market was expected to bring in US$10.36 billion in sales. from 2020 to 2025, the is projected to expand at a 37% CAGR (Compounded Annual Growth Rate) to reach USD 50 billion. CARE Conditions projects that, by August 2021, the pharmaceutical sector in India will grow at an average annual rate of 11% over the ensuing two years, arriving at a valuation of nearly $60 billion USD. Approximately 60% of the global immunization demand and 20% of the total volume of generic pharmaceuticals produced globally are supplied by India.

Figure 1.6 Anticipation of Revenue Of the Indian Pharmaceutical market

(Source: https://www.ibef.org/)

1.19 PHARMACEUTICAL EXPORTS FROM INDIA

In the global pharmaceutical and vaccine industries, India is a major player. It is the world's biggest supplier of generic medications. The nation produces over 60% of the world's vaccinations and accounts for 20% of the worldwide supply volume. India is the fourteenth largest country in the world in terms of value and third in terms of volume. OTC medications, generics, APIs, vaccines, biosimilars, and custom research manufacturing (CRM) are important sectors of the Indian pharmaceutical industry.

In terms of providing vaccinations like as DPT, BCG, and measles, India is the global leader. It also boasts the most US FDA-approved plants outside of the country. India is sometimes referred to as the "Pharmacy of the World" due to the country's pharmaceutical industry's primary USPs of cheap prices and excellent quality. For FY23 and FY22, respectively, the industry's total yearly turnover was US$ 49.78 billion and US$ 41.68 billion. The availability of reasonably priced HIV medications is one of the pharmaceutical industry's greatest successes in India. And India is among the world's main providers of inexpensive vaccines.

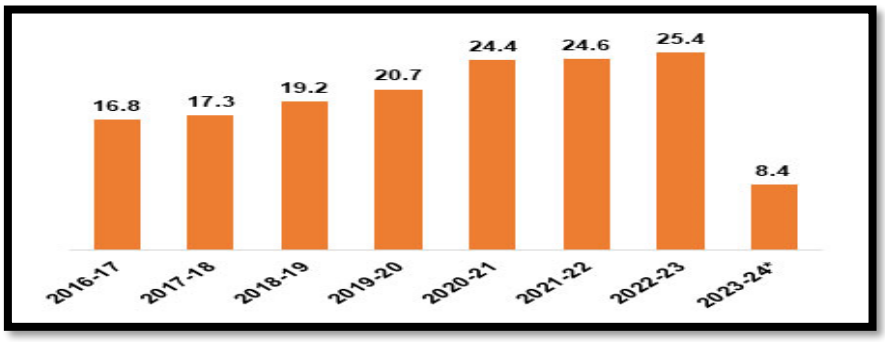
India majorly exports drug formulations & biologicals, and these products contribute to about 75% of the total pharmaceutical exports out of India.

- **Export Trend**

  India holds a 5.71% market share in medicines and medications worldwide. With a share of 72.54%, formulations and biologics made up the majority of India's exports, followed by bulk pharmaceuticals and drug intermediates. Drug and pharmaceutical exports totaled US$ 25.39 billion in FY23. Pharma products were exported by the nation for US$ 24.59 billion in 2021–2022, up 18% YoY to US$ 24.44 billion in 2020–21. Lockdowns, muted manufacturing, and interruptions to the global supply chain all contributed to this strong result. India exported US$ 8.71 billion worth of pharmaceuticals and medications in April–July 2023, up 3.99% from US$ 8.38 billion in the same period the previous year.

  India proved to be a dependable and steady pharmaceutical provider to the world even in times of crisis by playing a significant part in the COVID-19 epidemic.

Figure 1.6 India's drug and pharmaceutical export trend (US$ billion)



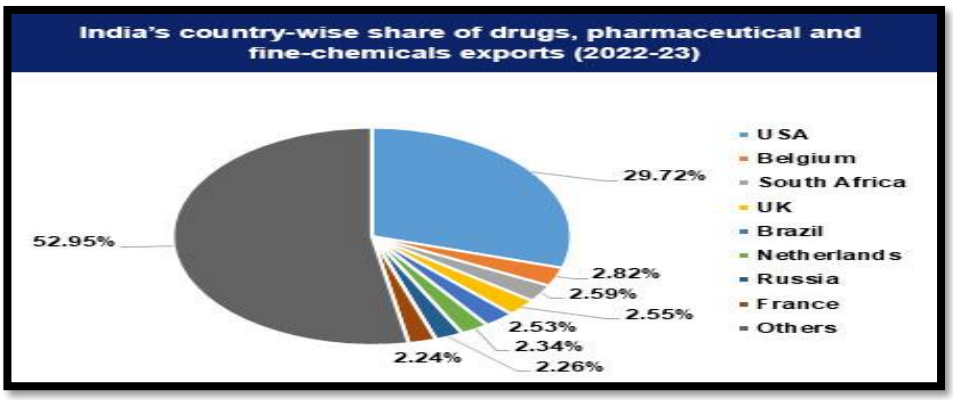
(Source: https://www.ibef.org/)

The largest number of businesses with USFDA compliance that have operations outside of the country are located in India. India is home to eight of the twenty largest worldwide generic enterprises, and more than fifty percent of its exports go to markets with strict regulations. About 65–70% of the vaccines required by the World Health Organization (WHO) come from India because it is the largest vaccine exporter in the world.

- **Export Destinations**

  Latin America and the Caribbean (LAC), Asia, the Middle East, the CIS, North America, Africa, the EU, and ASEAN are among the European regions to which India sells pharmaceutical goods. Africa, Europe, and NAFTA receive over two thirds of India's exports. In 2022–2023, the USA, Belgium, South Africa, the UK, and Brazil were the top five export destinations for the Indian pharmaceutical industry.

Figure1.7 India's country-wise share of drugs, pharmaceutical and fine chemicals export (2022-23)



(Source: https://www.ibef.org/)

In terms of percentage terms, the US, Belgium, and South Africa accounted for 29.72%, 2.82%, and 2.59% of all imports from India in 2022–2023. India exported pharmaceutical products worth US$ 7.54 billion to the United States in FY23; Belgium received US$ 714.92 million; South Africa received US$ 657.0 million; the United Kingdom received US$ 647.68 million; and Brazil received US$ 642.67 million. Over the past year, the value of India's pharmaceutical exports to the USA increased at a CAGR of 6.18%. Furthermore, throughout the same time period, it rose at a CAGR of 7.23% for South Africa and 59.2% for Belgium.

There were 703 USFDA-approved sites (bulk medications and formulations) as of April 2023. Furthermore, up until January 2023, 4,505 DMFs (Type ii Active) were filed by Indian companies. Due to the COVID-19 epidemic, USFDA inspections were not carried out in the previous few years; however, they are currently underway and are anticipated to boost Indian exports to the USA.

1.20 CORONAVIRUS IMPACT ON PHARMA SECTOR

After emerging from Wuhan, China in December 2019, the World Health Organization (WHO) designated the SARS-CoV-2 infection to be a global pandemic, classifying it as a novel coronavirus disease (COVID-19). With over 150 million people infected, COVID-19 has spread over the world and killed over 3 lakh people. COVID-19 has had a significant influence on the healthcare sector and has caused major disruptions to the whole supply chain, from raw materials to manufacture and delivery. Manufacturers of medical ventilators have been compelled by the global demand for their products to increase by as much as 40–50%. Additionally, companies and automakers have collaborated to supply the growing need. Together with other business personnel, governments and a plethora of organizations are fully committed to addressing the worldwide crisis. To meet the needs of consumers for pharmaceuticals, immunizations, diagnostics, and medical devices like ventilators, top executives engage in R&D activities, partner with strategic alliances, and launch novel products. Undoubtedly, this marks the first instance in contemporary history where the industry focused on diagnostics has been fully in the spotlight. Participants in the healthcare sector have abruptly shifted from being beneath the carpet to being above it. Global recognition of the necessity for early warning systems in the healthcare sector has

been achieved, first for COVID-19, but this trend will continue for other diagnostics in the future. Regarding the diagnostics industry, enormous development is anticipated. To this magnitude of a public health emergency, the healthcare sector was ill-prepared. The current condition of affairs indicated that some corporate activities were not strict enough in terms of rules, risk control, technology, production, procurement, or supply chain management. The industry's extreme vulnerability can be linked to a misperception of how environmental health risks can impact company operations. The epicenter of the global supply chain for surgical instruments, pharmaceuticals, and healthcare supplies is China, where the infectious virus originated. This caused a bad mix, which destroyed an important supply chain equilibrium. In this critical moment, the majority of industrial companies want to safeguard both their employees and other ongoing business processes. To do this, the staff members are supposed to fully sanitize themselves and cover themselves with masks. The government only permits manufacturing companies with the necessary face masks and other procedures to begin production in certain nations, like China, which is about to reopen its manufacturing facility. As a result, there is an increasing need for and availability of these items. The following graphic illustrates how the COVID-19 pandemic has affected the healthcare business based on industry.

1.21 KEY ISSUES IN THE PHARMACEUTICAL INDUSTRY

Millions of people worldwide receive life-saving medications and treatments from the pharmaceutical business, making it one of the most important sectors of the global economy.

It is one of the most difficult industries to work in, nevertheless, with a lot of particular challenges to conquer.

So, the following are the problems that the pharmaceutical business is facing:

- **Regulatory compliance**

Pharmaceutical firms are subject to a number of laws, ranging from those pertaining to clinical trials to standards for manufacture and distribution.

It can be difficult to stay on top of these requirements, and breaking them can cost you money in fines and harm your reputation.

- **Intellectual property**

  The pharmaceutical sector is fiercely competitive, and any business's ability to succeed depends on its intellectual property.

  The process of safeguarding and upholding patents can be intricate and expensive, and the risk of patent infringement never goes away

- **Pricing pressure**

  Government authorities and customers alike are putting more and more pressure on pharmaceutical businesses to keep the cost of their goods under control.

  It may become more difficult for businesses to invest in R&D and launch new goods as a result of this pressure, which may also result in reduced profit margins and heightened competition.

- **Supply chain management**

  The production, distribution, and transportation of drugs are handled by a number of parties in the intricate and strictly controlled pharmaceutical supply chain.

  Although difficult, ensuring the quality and safety of pharmaceutical products along the whole supply chain is crucial.

- **Data security**

  Pharmacies gather and retain enormous volumes of private information, including clinical trial and patient data.

  In an era of cyberattacks and data breaches, guaranteeing the security and integrity of this data is essential but can be difficult.

- **Aging population**

  The need for medications and therapies to address the health problems associated with aging is rising as the world's population ages.

  The pharmaceutical sector faces both possibilities and challenges as a result of this demand as they endeavor to produce new products that meet these needs while controlling healthcare costs.

- **Personalized medicine**

  New avenues for personalized medicine—wherein a patient's care is customized based on their own genetic profile—are being created by technological and genomic advancements.

  But creating customized medicines may be expensive and time-consuming, and there are important ethical and legal issues to take into account.

- **Public perception**

  The public's concerns about drug prices, healthcare access, and the role of pharmaceutical businesses in society have led to heightened scrutiny of pharmaceutical companies.

  Establishing and preserving a good reputation is essential for businesses in this sector.

- **Innovation**

  New findings and technology are continuously changing the pharmaceutical sector, which is driven by innovation.

  To stay competitive, businesses must stay on the cutting edge of these developments and create new treatments and products that cater to changing patient needs.

1.22 RECENT TECHNOLOGY TRENDS IN PHARMA INDUSTRY

Our lives are improved by technology, and we need all the assistance we can receive in the fight against a pandemic like COVID-19. Let's examine some emerging trends in pharmaceutical technology and healthcare technology as a whole, consider how they may impact their respective sectors, and see whether they may provide any encouraging news.

- **A Pandemic-Based Transformation**

  It's reasonable to argue that 2020 was a pivotal year for the pharmaceutical and healthcare sectors. In addition to forcing the medical community to rethink how patients and caregivers interact, the COVID-19 pandemic sparked a large pharmaceutical industry research and development push to create a vaccine. In 2024, let's examine some of the most exciting developments in pharmaceutical and healthcare technologies.

- **Telemedicine**

  Following COVID-19 guidelines on social distance, healthcare providers have to shift as much of their work as possible to a non-contact manner. Telemedicine garnered significant attention as a result. For example, doctors assess and diagnose patients from a distance, digitize treatment plans, and coordinate with pharmacies to send medications to patients via mail or courier. Because of COVID standards, the use of online cooperation, remote telemetry, video and

phone appointments, and consultations all rose in 2020 and will probably continue to be important in 2024.

- **Data-Driven Drug Development**

  Pharmaceutical businesses can make even greater progress in finding and creating new medications, as well as novel uses for already-existing substances, by using the potential of infinite data. Pharma technology is starting to see a big benefit from data-driven research.

  - **Big Data**

    Big data is a wealth of information that can be used to create new solutions. Fortunately, data scientists have at their disposal a wide range of techniques for sorting through massive amounts of data and extracting meaningful information.

  - **Artificial Intelligence.**

    AI analyzes data more quickly than humans, which is consoling given the volume of immunology research articles that are published every day. Artificial intelligence can be used by data scientists to select, evaluate, and provide fresh insights from the facts gathered from research projects.

  - **Digital Simulations**

    The statistic that nine out of ten clinical trials end in failure improves if more substances are introduced by researchers throughout the trial period. To do that, though, will necessitate data collection, variable exploration, and comparison of the novel therapeutic candidate with currently available alternatives.

1.23 CURRENT SCENARIO OF THE PHARMA INDUSTRY

India is the world's biggest supplier of generic pharmaceuticals and is renowned for its reasonably priced immunizations and generic meds. The pharmaceutical sector in India has grown over the previous nine years at a compound annual growth rate (CAGR) of 9.43%, placing it third in the world in terms of pharmaceutical output volume. Among the main sectors of the Indian pharmaceutical business are biologics, biosimilars, contract research & manufacturing, over-the-counter pharmaceuticals, bulk drugs, vaccines, and generics. The US Food and Drug Administration (USFDA)-compliant

pharmaceutical manufacturing facilities are most numerous in India, which also boasts 500 API companies accounting for around 8% of the global API market.

The generic drugs and inexpensive vaccinations produced by India's pharmaceutical industry are well-known worldwide. Indian Pharma has evolved over the years into a thriving industry and currently holds the third place in terms of volume of pharmaceutical manufacture. In terms of volume, the pharmaceutical sector in India is third globally, while in terms of value, it ranks fourteenth. At the moment, the pharmaceutical industry makes up about 1.72% of the GDP of the nation.

The Indian pharmaceutical market is predicted to reach a valuation of US$ 130 billion by the end of 2030, according to a recent EY FICCI analysis, since there has been a rising consensus on the provision of novel and inventive remedies to patients. Concurrently, it is projected that the worldwide pharmaceutical market would surpass $1 trillion in value by 2023.

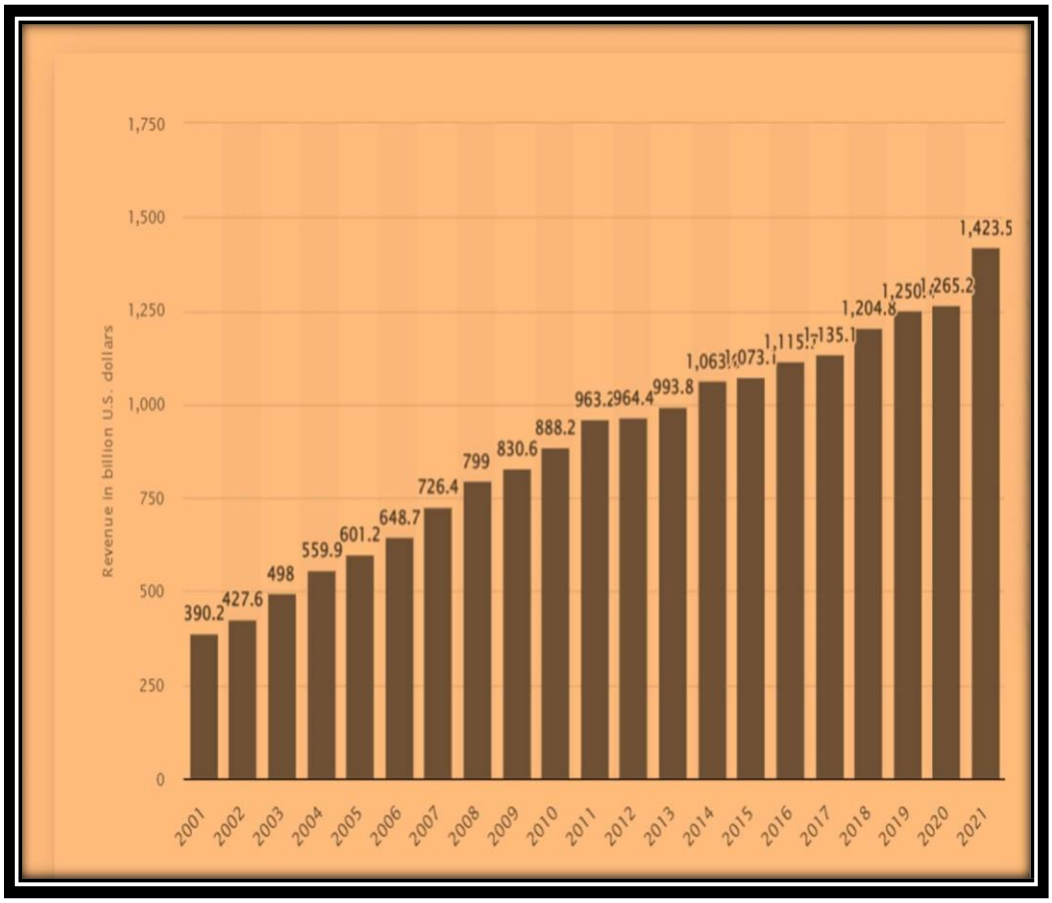
1.24 PHARMACEUTICAL MARKET: WORLDWIDE REVENUE

The pharmaceutical industry has grown significantly in size during the past few years. The entire pharmaceutical market was projected to be worth 1.48 trillion US dollars in 2022. Compared to 2021, when the market was estimated to be worth 1.45 trillion US dollars, this represents a very little rise. The pharmaceutical industry has a significant impact on both how and how much people pay for pharmaceuticals. Pharmaceutical companies do better in some markets than others, though.

Research, development, manufacturing, and distribution of pharmaceuticals are under the purview of the pharmaceutical industry. Pharma revenues globally reached 1.48 trillion U.S. dollars in 2022, reflecting the substantial growth the industry has seen over the last 20 years.

Nonetheless, sales of diabetic and autoimmune medications have witnessed some of the biggest increases in spending in recent years. The development, production, and distribution of medications are under the purview of the pharmaceutical sector. Due to the pharmaceutical market's explosive growth during the previous 20 years, global pharmaceutical revenues are expected to reach $1.42 trillion in 2021.

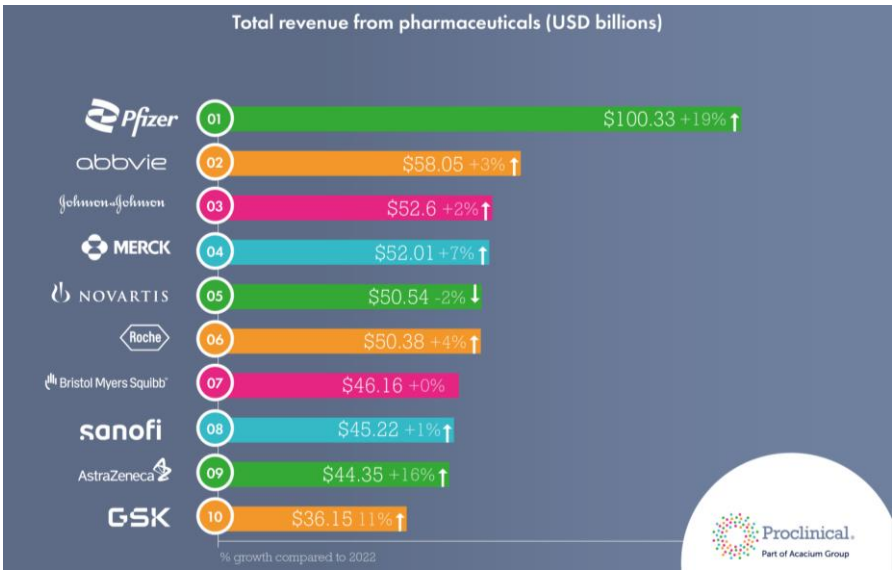
Figure 1.8 Revenue Of The Worldwide Pharmaceutical Market From 2001 To 2021



(Source: https://www.statista.com/)

The pharmaceutical market has a global presence, but the world's biggest markets are the US and Europe.

Figure 1.9 top 10 pharmaceutical companies in the world 2023



(Source: https://www.proclinical.com/)

1.25 INDIAN PHARMA SECTOR: SWOT ANALYSIS

The pharmaceutical industry is a significant economic sector with a large customer market. This sector is known for discovering, developing, and manufacturing usable medicines. Pharma companies must adhere to a set of laws that govern the entire process. SWOT analysis in the pharmaceutical sector will aid in industry analysis, allowing one to make the necessary improvements. It also shows what preventative measures should be implemented to improve the sector. Understanding the SWOT analysis of their company or industry is critical for management executives. A SWOT analysis of the pharmaceutical sector demonstrates to upper management what the sector excels at, what needs to be improved, where growth is possible, and what preventative measures are necessary to safeguard shareholder or company value.

- **S-Strengths**

  India manufactures medications that are more cost-effective and efficient than those produced in other countries. India is noted for having a booming manufacturing sector. Technology has advanced to the point where India today employs a highly skilled labor force. A diversified environment also benefits the industry.

- **W-Weaknesses**

  Despite the loosening of FDI restrictions, industry and government must address the paucity of investment in R&D. One major concern is the absence of collaboration between industry and academia. In compared to other households. Healthcare costs appear minimal. The pharmaceutical business faces Competition comes from the manufacture of low-cost, inferior medications.

- **O-Opportunities**

  Better export potential are likely to fuel the company's rapid expansion. Furthermore, a spike in the export of generic medications to industrialized nations is anticipated. India has enormous potential to develop and become a center for international clinical trials. Additionally, it is anticipated that India will have a major worldwide influence on pharmaceutical research and development (R&D).

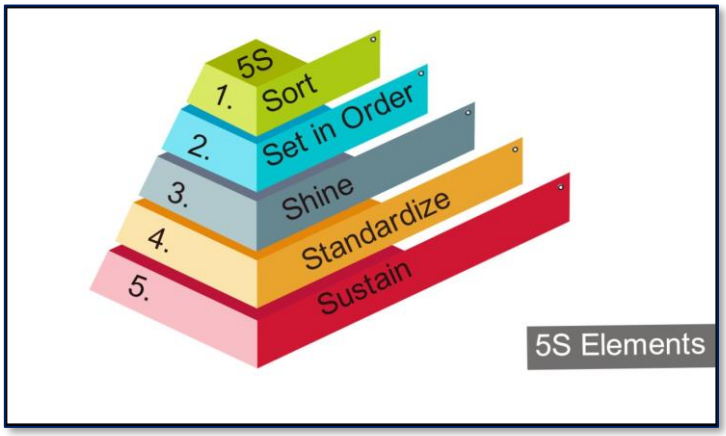
- **T-THREATS**

  The product patent policy is one of the most significant barriers to domestic industry. To address this challenge, the industry must increase its R&D efforts. The Indian government's Drug Price Control Order imposed excessive expectations on product prices, affecting pharmaceutical businesses' profitability. The new excise duty structure based on MRP poses a threat to small firms.

1.26 '5S' IN THE PHARMACEUTICAL INDUSTRY

A process industry is defined as a manufacturing process that involves a chemical change, and it comprises segments such as glass and ceramics, as well as industries related to the production of chemicals, minerals, coal, metal, and consumables, to mention a few.

Figure 1.10 The philosophy of 5S is built around the following five terms:



(Source: https://pharmastate.academy)

- **Sort (Seiri)**

  Sorting is the first step in 5S. The significance of this notion resides in examining items (e.g., tools, lubricants, items utilized for task changes) in the workplace and determining what is truly required to complete the job efficiently and successfully. If it is important for the job, it is marked; otherwise, it should be discarded.

  Sorting's benefits include:-

  - a more effective use of space,
  - simplified tasks,
  - a reduction in hazards, and
  - a significant decrease in distracting clutter.

- **Set in Order (Seiton)**

  This idea is best understood as figuring out the best location for all items required to do the task at hand. Any tool, SOP, MSDS manual, or other item required for the job has to have a designated location where it is always easy to locate when needed. Changes in employment can occur often and for extended periods of time in the process industry. If necessary, equipment needs to be located because it is out of place, this increases waste (line downtime).

  Set in Order has the advantage of having everything required for the task at hand readily accessible in one place. An excellent illustration of this idea is a maintenance shop, where each tool's outline is posted on the wall. All of the tools are readily apparent, so if one is not in its proper place, the user can identify and take corrective action before it is too late. Thus, as noted in the Journal of the Institute for Quality Assurance, knowing where to search is the first step in starting a standardized procedure.

- **Shine (Seiso)**

  This third idea is founded on the realization that unnecessary items have now been removed from the process, and the necessary tools and equipment have been arranged for effective utilization. Keeping the work environment and process equipment—that is, everything else utilized to create the product—clean is the following step as a result. Process variability is more likely when a production process is unclean.

  Think about dirt entering a coating or batch process, for instance, and eventually leading to rejects because of "foreign material." Because of problems with cleanup, filthy processes frequently take longer to switch over, which can lead to production loss or equipment failure. Once more, this wasted time is seen as non-value-added time. It's also important to keep in mind that a filthy environment is more likely to have safety hazards that could result in worker injuries.

- **Standardize (Seiketsu)**

  Establishing a uniform procedure for system maintenance is the major goal of this term. As per a group inside the lean industry, the fourth idea entails establishing the benchmarks that employees must adhere to in order to monitor and preserve "cleanliness." Visual management is one of SEIKETSU's key components [for the work environment]. For more straightforward visual identification of irregularities

in the surroundings, color-coding and consistent colors of the surroundings are employed. Employees are taught to use their five senses to identify irregularities and to respond quickly to remedy them.

- **Sustain (Shitsuke)**

  This is the phase that presents the greatest challenge, according to the majority of users and research on 5S implementation. In order for the organization to sustain the progress made, it entails integrating the 5S mindset into daily operations. The idea is to put the newly acquired behaviours into practice. It means that rather than being a reaction to an audit finding, everyone engaged must feel empowered to uphold standard operating procedures, cleanliness, and order as a way of life. This stage "focuses on defining a new status quo and standard of work place," as user experience notes.

1.27 CONCLUSION

India's pharmaceutical sector is noteworthy in every aspect. India is ranked fourteenth in terms of value and third in terms of output volume in the world. With 20% of the global supply of generic drugs, the nation is the biggest provider of these medications and the world's top producer of vaccinations. India is home to the largest number of US FDA-approved pharmaceutical plants outside of the US, with over 3,000 pharmaceutical companies and over 10,500 production units in its network.

The pharmaceutical manufacturing market is growing due to several factors, including rising spending on R&D for pharmaceutical companies, advancements in technology, heightened focus on the healthcare needs of developing countries, an aging population, and an increase in the rate of infection of chronic diseases.

There are 60,000 generic drugs available in 60 therapeutic applications from the Indian pharmaceutical industry. Generic pharmaceuticals, over-the-counter medications, API/bulk medications, vaccines, contract research and production, biosimilars, and biologics are a few of the important industries.

- The approval of incentives of INR 21,940 crore ($3 billion).
- Market size is anticipated to reach $65 billion by 2024 and over $130 billion by2030.

- 11–12% is the predicted growth rate (2020-2030).
- Manufacturing costs are 33% less expensive than in Western markets.

Thanks to their affordable and superior products, Indian pharmaceutical businesses have become worldwide leaders, producing 20% of the world's generic drugs and 60% of the world's vaccines.

For greenfield pharmaceuticals, 100% Foreign Direct Investment (FDI) is allowed under the automatic approach. Government authorization is required for the remaining 26% of the pharmaceutical business, while 74% of it is allowed automatically.

The healthcare sector includes the pharmaceutical industry, which deals with medications. The industry is split up into smaller sectors that work on product, medicine, and marketing development. These more or less interconnected subfields include biotechnology businesses, pharmaceutical makers, and pharmaceutical marketers. Creating medications that help with illness treatment, infection prevention, and health maintenance is the major objective of the pharmaceutical industry. Since this sector directly affects the world's population, a number of international governmental organizations keep an eye on issues including the safety, quality, patents, and cost of medicine.

Following are some of those authoritarian individuals:

- World Health Organization (WHO)
- US Food and Drug Administration (FDA)
- Medicines and Healthcare Products Regulatory Agency (MHRA)

There is a complex network of rules in the exploration. Every phase of a drug's life cycle, including marketing approval, generic competition, and patent expiration, is under the complete control of the pharmaceutical industry. All doctors, pharmaceutical makers, wholesalers, and retailers are subject to the laws.

Pharmaceutical industry regulators keep an eye on a variety of drug-related issues:

- Quality

- Quantity
- Research and development incentives
- Pricing
- Patents
- Safety
- Market Flow

The world's safest and most sophisticated pharmaceutical system is available to American consumers, according to the FDA (US Food and Drug Administration). The FDA's Center for Medical Evaluation and Examination, which evaluates novel drugs prior to their introduction onto the market, serves as the primary consumer watchdog in this system. The facility verifies that the health benefits of both name-brand and generic drugs outweigh any known side effects.

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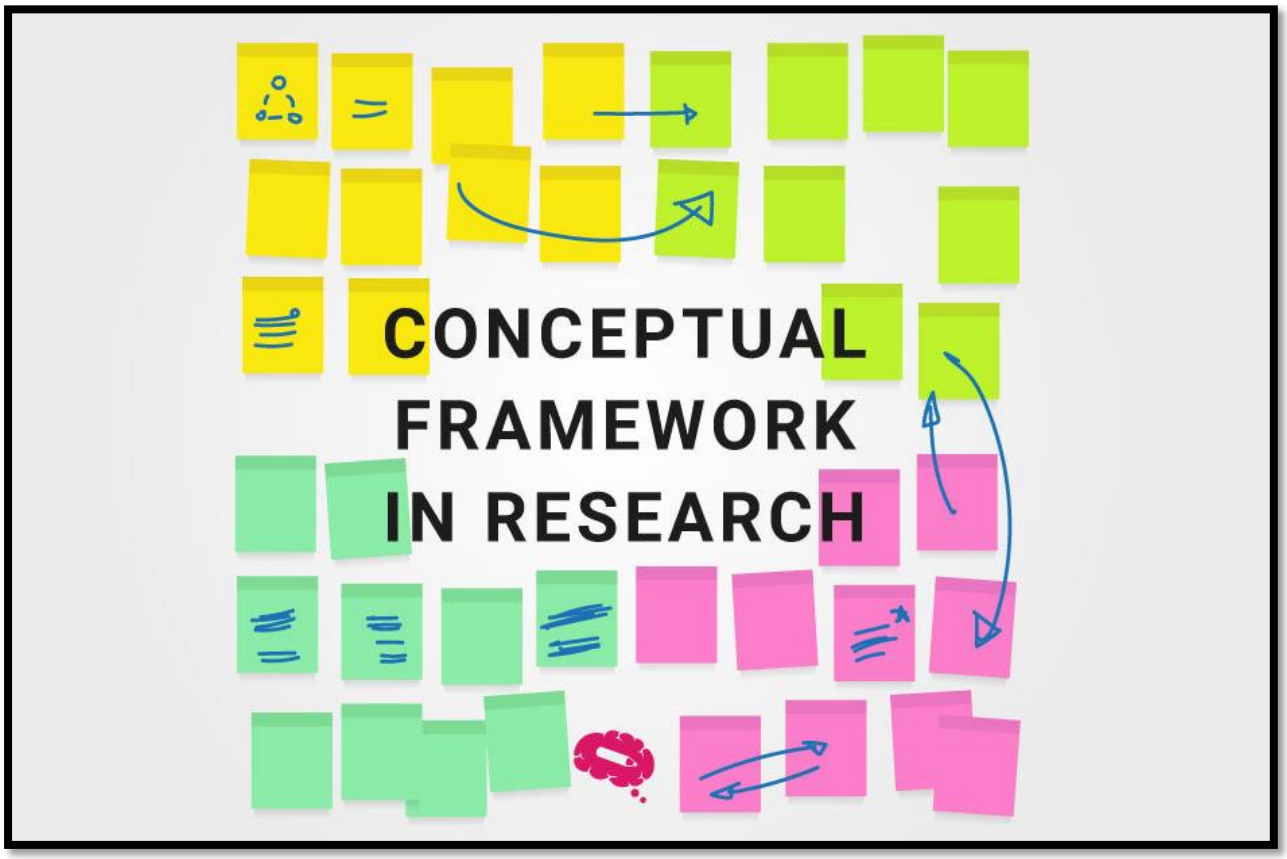
CHAPTER 2

CONCEPTUAL FRAMEWORK OF THE M.DANIEL BENEISH "M-SCORE" MODEL & SAMPLE PROFILE OF COMPANY



INDEX

2.1 INTRODUCTION

A conceptual framework serves as a roadmap for research studies, theories, or models, providing a coherent and systematic approach to understanding complex phenomena or solving problems within a given field. It establishes foundational principles, concepts, and assumptions, guiding the development and interpretation of research studies. The framework helps researchers clarify their objectives, identify relevant variables, and establish the relationships between them. It also aids in organizing existing knowledge and informing the design of empirical studies.

A conceptual framework is a representation of the expected relationship between variables or the characteristics and properties to be studied. It can be written or visual and is generally developed based on a literature review of existing studies about the topic. The process of developing a conceptual framework involves choosing a research question to guide the work and determining the relevant variables for the study.

The conceptual framework is an essential tool that must be used in financial reporting. It creates a connection between different financial statements and the parts that make them up. This facilitates the prompt and accurate preparation of and expedites the resolution of issues.

monetary statements. The assessment of an entity's financial performance is reflected in the financial analysis. It illustrates how far the organization has come under the current management. It is an essential tool for evaluating the overall health of the entity over the given time frame and in relation to peers. Financial data is typically examined using business governance, profitability trend, fund flow analysis, cash flow analysis, and ratio analysis.

2.2 BENEISH SCORE MODEL

- ### WHAT IS THE BENEISH SCORE MODEL?

The Beneish model is a statistical model that determines whether a corporation has manipulated its earnings using eight factors and financial statistics. It is a method for locating financial fraud.

After being computed, the variables are built using information from the company's financial statements to provide an M-Score that indicates how much the earnings have been manipulated.

- **WHO CREATED THE MODEL?**

  The approach was developed by Indiana University's Kelley School of Business professor M. Daniel Beneish. Beneish's paper "The Detection of Earnings Manipulation" was released in 1999, but he had been working on the model for years.

  Since the model's first publication, Professor Beneish has authored numerous extensions and follow-up research projects. The business school's Beneish webpage has an M-Score calculator.

- **UNDERSTANDING THE BENEISH MODEL**

  Beneish's main hypothesis for calculating the ratio is that businesses that exhibit declining gross margins, growing operating expenses, and rising debt in conjunction with notable sales growth may be more inclined to manipulate their earnings. These elements could lead to different types of profit manipulation.

  The Beneish model's eight variables are:

  1. DSRI: Days' sales in a receivable index
  2. GMI: Gross margin index
  3. AQI: Asset quality index
  4. SGI: Sales growth index
  5. DEPI: Depreciation index
  6. SGAI: Sales and general and administrative expenses index
  7. LVGI: Leverage index
  8. TATA: Total accruals to total assets

  Following their computation, these eight factors are added together to provide the company's M-Score. If the company's M-Score is less than -1.78, it indicates that it won't be manipulative. If the company's M-Score is higher than -1.78, it suggests that it may be a manipulator.

  The formula to calculate the M-score is: $M\text{-score} = -4.84 + 0.92 \times DSRI + 0.528 \times GMI + 0.404 \times AQI + 0.892 \times SGI + 0.115 \times DEPI - 0.172 \times SGAI + 4.679 \times TATA - 0.327 \times LVGI$

There are two possible conclusions that can be made using the M score:

- **Beneish M Score < -2.22:** the company is not likely to have manipulated their earnings
- **Beneish M Score > -2.22:** the company is likely to have manipulated their earnings

- **REAL WORLD EXAMPLES OF THE BENEISH MODEL'S APPLICATION**

  A team of business students from Cornell University predicted that Enron Corporation was manipulating its earnings in 1998 by using the Beneish model.

  Enron's stock was only trading at around half of its ultimate peak of $90 per share at the time, which it finally reached before its precipitous collapse into bankruptcy and disaster a few years later in 2001. The Cornell students raised the alarm, but Wall Street ignored their advise at the time.

  When selecting which companies to invest in, a number of professional investment firms and investors take into account a company's Beneish M-Score as part of their evaluation process for the companies they monitor.

- **KEY TAKEWAYS**
  - The Beneish model is a statistical model that determines whether a corporation has manipulated its earnings using eight factors and financial statistics.
  - The variables are built using information from the financial statements of the business to produce an M-Score that indicates the extent of earnings manipulation.
  - A primary application of the Beneish model is as a tool to uncover financial fraud.
  - The model was developed by Professor M. Daniel Beneish of Indiana University's Kelley School of Business, and he published it in a paper in 1999.
  - Renowned business students from Cornell University made a famous prediction about Enron Corporation's financial manipulation using the Beneish model.

2.3 TOP 5 PHARMACEUTICAL COMPANIES OF INDIA IN 2022-23

Table 2.1Top 5 Pharmaceutical Companies

NAME OF THE COMPANY
1. SUN PHARMA
2.CIPLA
3. DR. REDDY'S LABS
4. Torrent Pharmaceuticals Company
5. Zydus Cadila Healthcare Limited

2.3.1 SUN PHARMACEUTICAL INDUSTRIES LTD.

Table 2.2 Sun Pharma's Basic Information

Founder	Dilip Shanghvi
Established in	1983
Headquarter	Mumbai, Maharashtra, India
Products	Pharmaceuticals, Generic drugs, Over-the- counter drugs, vaccines, diagnostics, etc.

(Source:https://medicinespatentpool.)

(Source:https:Sun-Pharma.png)

Vision

Sun Pharma, a prominent supplier of valuable pharmaceuticals, aspires to reach people and transform lives globally.

Misson

In order to benefit society, Sun Pharma will leverage its networks, people, and knowledge to the fullest by meeting local needs and promoting overall growth. The company, an international pharmaceutical giant, firmly believes that business and responsibility go hand in hand.

Diversified Specialty and Generics Portfolio

- A wide variety of pharmacological formulations for both emergency and chronic therapies are produced and marketed by Sun Pharma.
- It provides more than 2000 premium chemicals in a range of dosage forms, such as liquids, tablets, capsules, ointments, creams, and injectables.
- Antiretrovirals (ARVs), intermediates, active pharmaceutical ingredients (APIs), over-the-counter (OTC) medications, and specialized, expensive, or technologically complex products are all included.
- The company sells almost 30 billion doses annually in the following medical specialties: neurologist, cardiologists, gastroenterologists, diabetologists, antibiotics, cancer, ophthalmologists, dermatologists, urologists, nephrologists, and respiratory.

Global Footprint

- Sun Pharma is second in the generic dermatological market in terms of prescriptions and is among the top ten generic medicine manufacturers in the US.
- With more than 80 markets under its belt, it is the biggest Indian company in emerging economies. Among our significant emerging markets are South Africa, Brazil, Mexico, Russia, and Romania.
- Some of the key markets where it is found are China, Japan, New Zealand, Canada, Australia, and Western Europe.

Milestones

- In Canada, Sun Pharma introduced ILUMYATM (Tildrakizumab injectable), a treatment for moderate-to-severe plaque psoriasis.
- Revital NXT, the nation's first nutrition bar featuring the advantages of natural ginseng, 16 vitamins and minerals, and triple blend protein, was introduced to the Indian nutrition bar market.
- We just commemorated 25 years after going public on Indian stock exchanges.
- It introduced ILUMYATM for the treatment of plaque psoriasis in Japan.

Recognized in Recent Times

- Sun Pharma received the 2020 Golden Peacock Award for Corporate Social Responsibility.
- Dun & Bradstreet India Corporate Award was given to the company in the Pharmaceuticals Sectoral Performance-based category.
- India, which accounts for 20% of all international exports, meets more than 50% of the global need for various immunizations and 40% of the US market for generic goods.
- The Indo-American Corporate Excellence Awards named it the Best Innovative Company of the Year 2021.
- It was named to the Forbes list of the World's Best Employers for 2020.
- The 2020 Nielsen BASES Top Breakthrough Innovation Winners for India list featured Volini, one of the company's best-selling over-the-counter items.

2.3.2 CIPLA

Table 2.3 Cipla's Basic Information

Founder	Khwaja Abdul Hamied
Established in	1935
Headquarter	Mumbai, Maharashtra, India
Products	Pharmaceuticals and Diagnostic Products

(Source: https://www.javatpoint.com/top-10-pharma-companies-in-india)

(source: Cipla logo.svg)

Mission

Cipla is the preferred partner for global health organizations and stakeholders due to its humanitarian approach to healthcare and commitment to its goal of "Caring for Life."

Business Overview

The top pharmaceutical firm in the world, Cipla, is committed to making both branded and generic medications of the highest caliber. Worldwide, patients and medical professionals have confidence in the Company. Care is the cornerstone upon which Cipla, as an organization, has been constructed, brick by brick. Preserving life has been and will continue to be its primary objective. With over 1,500 pharmaceuticals available in more than 50 dosage forms across multiple therapeutic categories, we have expanded our reach to more than 80 countries and share a common objective of becoming a trusted partner for global health organizations and stakeholders. It is increasing its presence in important regions including South Africa, India, and the United States as well as the economy of other developing countries in an effort to increase access to healthcare on a worldwide scale. For almost eight decades, Cipla's efforts have been motivated by the goal of improving the lives of patients.cipla's fundamental objective of "Caring for Life" has been as our inspiration and direction for the previous 85 years. With its humanitarian spirit and tradition serving as its compass, Cipla has once again taken the lead in combating pandemics like COVID-19, swine flu, bird flu, and HIV/AIDS.

Global Presence

Cipla Australia, which has its headquarters in Melbourne, has a substantial product pipeline that it ships to Australia, the US, and Europe. Millions of

Australians have access to medication made by Cipla thanks to its network of community pharmacy partners.

Hospital, over-the-counter, HIV, and anti-infective medications are among the many medications that Cipla Europe provides. Norway, Spain, Germany, and the UK are all experiencing it right now. Through our channel and authorized partners, it mainly conducts business in the remainder of Europe.

Breath Free Lanka Pvt Ltd is another name for Cipla's Sri Lankan branch. Over the course of its two decades in the nation, the company has unveiled several innovative and noteworthy items.

Achievements in Recent Years

- Berok Zindagi received the Gold Health Marcom Award for Best IntegratedHealthcare Campaign.
- Gold for Best CSR Initiative by a Brand in the Rural Nebulizer Access ProgramCampaign
- Cipla's Remdesivir receives Gold in the "Covid Care Brand" Category.
- Cipla receives the National Energy Conservation Award 2021 from the Bureau of Energy Efficiency, Ministry of Power, Government of India, in the category of drugs and pharmaceuticals.
- Platinum Award for Sustainability in the Apex India Green Leaf Award 2020 Gold Award for Environmental Excellence for Sikkim Unit I, Unit II, and Goldencross.
- Golden Peacock Global Award for Excellence in Corporate Governance in 2020.
- SAPACE Award 2020 in Strategic HR & Talent Management for Digital Transformation of HR & Talent Management Process.

2.3.3 DOCTOR REDDY'S LABORATORIES LIMITED

Table 2.4 Doctor Reddy's Lab's Basic Information

Founder	Kallam Anji Reddy
Established in	1984
Headquarter	Hyderabad, Telangana, India
Products	Pharmaceuticals, generic, over-the- counter, vaccines, diagnostics, contact lenses, and animal health.

(Source: https://www.javatpoint.com/top-10-pharma-companies-in-india)

(Source: https://www.cphi-online.com)

Mission and ambitions converge

- The company's staff members pledge their patients that they would use their creativity, determination, and willpower to enhance world health.
- It all started in 1984 with a huge concept and a tiny investment. With its manufacturing facilities, R&D centers, and global commercial presence, the company is currently serving more than 500 million patients globally. By 2030, the company wants to communicate with over 1.5 billion patients.

Culture

Any one of the more than 24,000 employees at Dr. Reddy's will reply that they work every day because maintaining good health is essential. This is

our mission statement and the inspiration behind all we do. In addition to being a tool to help patients stay fit, it views healthcare solutions as scientific concoctions that might allow people to live healthier lives. And to that end, the business fosters a sensitive, vibrant culture.

Five Promises

The company clarifies what it does, what it delivers, and the obligations it makes to its stakeholders through five pledges. The company's commitments encourage them to pursue higher standards of quality while prioritizing the needs of its patients in all that they do.

- Making expensive medicines more accessible;
- Meeting unmet patient needs;
- Assisting patients in better disease management;
- Providing partners with the tools they need to ensure medicines are availablewherever they are needed;
- Working together with partners to ensure their success.

Awards

- Outstanding Workplace - Colombia Team
  Dr. Reddy's Colombia deserves to be recognized for receiving the Great Place to Work designation for the second year in a row.
- The best places to work in New Jersey
  As one of the "Best Places to Work in New Jersey," received recognition. The Best Companies Group awarded the prize based on the findings of two studies: anemployer survey and an employee satisfaction and involvement survey.
- Top 20 global pharma and biotech employers
  According to Science Magazine, one of the oldest and most prestigious scientific journals, Dr. Reddy is one of the top 20.

2.3.4 Torrent Pharmaceuticals Limited

Table 2.5 Torrent Pharma's Basic Information

Founder	Sudhir Mehta, Samir Mehta
Established in	1959
Headquarter	Ahmedabad, Gujarat, India
Products	Pharmaceuticals, generic drugs, over-the-counter drugs, diagnostics, contact lenses, animal health, and vaccines.

(Source: https://www.javatpoint.com/top-10-pharma-companies-in-india)

(Source: https://www.jobriya.in)

Integrity: When the Real Story Comes First

Whether or not someone is looking, doing the right thing at all times and in all circumstances involves both thoughts and deeds. Inner fortitude and dedication are necessary, no matter the outcomes. It entails being true to one's word and taking full accountability for one's deeds.

Business Overview

The parent business of the Torrent Group, Torrent Pharma, is one of the leading pharmaceutical companies in the country. The company led the Indian market in women's, cardiovascular (CV), nervous system (CNS), and gastrointestinal (GI) healthcare (WHC) and was the pioneer in specialty marketing. The company also has a significant presence in the areas of pain treatment, diabetes, cancer, gynecology, and anti-infectives.

Torrent Pharma has a competitive advantage because of its top-notch manufacturing facilities, strong R&D capabilities, wide-ranging domestic network, and notable global presence in more than 40 countries. Zyg Pharma acquired Elder Pharma's Indian branded business in 2015, while Elder Pharma acquired Glochem Industries' API facility in 2016. Then, through an ANDA, Ranbaxy made minocycline available for purchase in the US market in 2015. Additionally, Torrent Pharma has a substantial international footprint spanning 40 nations, with operations in both developed and developing markets, including the US, Europe, Brazil, and the Rest of the World. With the aid of our powerful manufacturing technologies and manufacturing facilities, its main goal in this endeavor is to preserve both the qualitative and quantitative components.

Milestones

- Dr. Reddy's Laboratories Ltd. agrees to sell the brands "Styptovit-E," "Finast," "Finast-T," and "Dynapress" to Torrent Pharma.
- Torrent Pharma enters into a licensing agreement with Medicine Patent Pool to manufacture and market a generic version of Pfizer's oral COVID-19 treatment.
- Boehringer Ingelheim India Private Limited has signed a co-marketing agreementto jointly market the company's anti-diabetic medication and fixed-dose combinations in India.
- Torrent Pharma acquires Curatio Healthcare to strengthen its position in the rapidly expanding dermatology market.
- Torrent Pharma launches molnupiravir products from Ridgeback and MSD in India under the brand name Molnutor. Merck & Co., Inc., Kenilworth, NJ, USA, ownsthe MSD brand.
- Torrent Pharma and Lilly entered into a voluntary licensing agreement to produce and distribute Baricitinib for Covid-19 India.

2.3.5 Zydus Cadila Healthcare Limited

Table 2.6 Zydus Cadila's Basic Information

Founder	Mr. Ramanbhai Patel
Established in	1952
Headquarter	Ahmedabad, Gujarat, India
Products	Pharmaceuticals, generic drugs, over-the-counter drugs, vaccines, diagnostics, contact lenses, animal health

(Source: https://www.javatpoint.com/top-10-pharma-companies-in-india)

(Source: https://etimg.etb2bom/photo/60274751.cms)

VISION

to be the community's main supplier of healthcare services.

MISSION

High-quality community healthcare solutions are provided by using optimal management practices, technology advancements, and medical science developments.

BUSINESS OVERVIEW

Zedus Cadila, also known as Cadila Healthcare Limited, is a multinational pharmaceutical company with its headquarters in Ahmedabad, Gujarat, India. Generic drugs are its main product. In 2020, it ranked 100th on the Fortune India 500 list. Raman Bhai Patel's company, Zydus Cadila, is

expected to rank seventh in India by 2020. With more than 30 production sites spread across Brazil, the US, and India, it has operations in over 25 countries. At twenty-five pharmaceutical production sites in India, Zydus Cadila carries out research and development for pharmaceuticals, diagnostics, herbal remedies, skincare products, and other over-the-counter items. Indian cities like Patalganga, Ankleshwar, and Vadodara are the locations where the business manufactures active medicinal ingredients.

Developing novel medications for the future is the main goal of Zydus' Innovation programme, which employs 1300 researchers in 19 sites. Like NCEs, vaccines, biosimilars, and specialised technologies, the group is always coming up with and studying new ideas and concepts. For Zydus to conduct business globally, it is imperative that it has access to the regulated markets of the United States, Europe (especially France and Spain), and South Africa. It is equally widespread in twenty-five other developing markets worldwide. The company has made Rs. 6500 crores in sales overall.

Zydus Lifesciences Limited

Zydus Lifesciences Limited, the parent business of Zydus Pharmaceutical, is a worldwide healthcare provider with a fully integrated organisation based in Ahmedabad, India. Having been in operation for more than 70 years, the organisation is motivated by a desire to innovate and change the health and care sectors. With operations in 55 nations, including South Africa, Brazil, Mexico, France, Spain, and India, Zydus Lifesciences is the fourth-largest pharmaceutical firm in India. Formulations, APIs, vaccines, biosimilars, complicated medications, animal health products, and wellness items are all produced along the pharmaceutical value chain by Zydus Lifesciences, a significant pharmaceutical company.

MILESTONE

Zydus Lifesciences Limited replaced Cadila Healthcare Limited as the company's name in 2022. The company's new corporate identity includes two purple and teal hearts to symbolise its dedication to nurturing, research, and innovation.

In 2021, India approved the use of Zydus Cadila's ZyCoV-D vaccination for adults and children 12 years of age and older in an emergency. It was the first plasma DNA vaccination authorised for use in humans.

The US Food and Drug Administration names Saroglitazar Mg as a significant medication for the treatment of patients with PBC in 2021.

2.4 Conclusion

The structure that holds or supports a research study's theory is known as the theoretical framework. It presents and explains the subject matter's underlying theory. By concentrating on particular factors and outlining the particular perspective (framework) that the researcher will take while evaluating and interpreting the data to be collected, a theoretical framework helps to restrict the scope of the pertinent data.

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CHAPTER 3

LITERATURE REVIEW

CHEPTER 3

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3.1 INTRODUCTION

A literature review is a crucial part of any research project since it gathers and summarizes previous research on a certain topic. An summary of the sources you used to examine a particular topic and how your research fits into a broader field of study are the two main objectives of a literature review.

The literature review's two main focus areas are as follows:

- Investigate right information
- Evaluate it critically

A literature review looks at books, scholarly articles, journal articles, conference proceedings, and other materials that are pertinent to a topic or field of study. Its purpose is to describe, summarize, and critically assess these materials in light of the research problem that is being studied. You will be happy that you took the time to examine the design and architecture of the research since it provides opportunity for a more thorough analysis and interpretation of the research problem when you begin writing your literature review section.

3.2 WHAT IS A LITERATURE REVIEW?

A literature review is an investigation and critical assessment of the corpus of information pertaining to the study issue. It offers the most recent data about the problem or subject the researcher is going to study.

- Increases the validity of work by demonstrating familiarity with a body of knowledge.
- Summarizes previous studies and explains how current research relates to them.
- Reading literature reviews allows the researcher to become informed about the state of knowledge in his chosen field, as well as its boundaries and limitations.

3.3 LITERATURE REVIEW RELATED TO BENEISH MODEL

(Ehigie, 2023) Using the Beneish model, this study looked at corporate governance and financial statement manipulation in Nigeria. In order to achieve this, the Beneish Model was utilised to forecast the probability of financial statement manipulation in Nigerian companies, and logistic

regression analysis was utilised to investigate the contribution of corporate governance variables to this manipulation. The determinants under investigation were the corporate governance variables of Board Composition, Board Gender Composition, Audit Committee Composition, and Board Dominance. During the six-year period of 2009-2014, sixty-five (65) quoted businesses on the Nigeria Stock Exchange provided the data that was used. [1]

(Ahmad K & Deimantė V, 2023) Financial reporting fraud is a serious problem for all parties involved, not just investors. Two widely used fraud detection models by Dechow et al. (2011) and Beneish (1997, 1999) are used in this study. This paper's primary objective is to evaluate how well these two models forecast fraud in Iranian enterprises' financial statements. First, we attempt to determine the statistical description associated with the Dechow and Beneish models' first and fourth quartiles. Next, we use variance analysis and the t-test in SPSS software to assess the models' forecasting ability. We employ a sample of 197 businesses over the 11-year period between 2009 and 2019. The amount of deception in the company's financial statements is shown by the Beneish model's general precision of 83% as opposed to the Dechow model's general precision of 75%. The statistical findings indicate that the Beneish model has a higher prediction precision and a lower estimation error than the Dechow model. As a result, this hypothesis states that compared to the Dechow model, the Beneish model has a higher detection capability for the likelihood of financial statement fraud.[2]

[1] Ehigie, Aimienrovbiye & Okoeguale, Peter. (2023). Beneish Model, Corporate Governance and Financial Statements Manipulation. 10.17576/AJAG-2019-12-05) https://doi.org/10.17576/ajag-2019-12-05

[2] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

(Freina R & Novita, 2023) Given the high value of project contracts, there is cause for grave worry regarding the rise in construction project fraud cases that have cost Indonesia significant sums of money. Both internal and external parties' pressure, ability, collusion, opportunity, justification, and ego all play a part in this scam. We refer to this indicator as the fraud hexagon idea. The fraud has an effect on the amount of taxes, fines, and audit procedure in addition to the correctness and dependability of the financial accounts. The goal of this study was to use the Beneish M-Score Model to identify false financial statements by analysing the impact of the fraud hexagon—stimulus, capability, collusion, opportunity, rationalisation, and ego. This research is quantitative study using purposive sampling method with criteria, construction companies listed on the Indonesia Stock Exchange (IDX) and issuing annual reports for the 2017–2021 period. There are 75 observation samples from 15 companies. Methods of data analysis using logistic regression analysis with testing using STATA14.[3]

(Adrian T, R. N. Wokas, & Sherly P, 2023) The objective of this research is to evaluate the degree of financial statement manipulation and analyse manufacturing companies' profits quality in terms of relevance using the Beneish M-score. Qualitative research using a descriptive methodology is the method employed. The subject of this study is one of seven manufacturing companies that are listed on the Indonesia Stock Exchange (IDX). The Beneish ratio index study's findings indicate that in 2019 there were a greater number of manufacturing companies classified as non-manipulators, both LQ45 and non-LQ45. Similarly, in 2020, manufacturing companies were classified as non-manipulators because those companies had no more than three of the eight parameter indices that make up the Beneish ratio index.[4]

[3] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[4] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

(s m. , 2022) This study examines financial statement inconsistencies for Polish companies listed on the Warsaw Stock Exchange between 2015 and 2020 using the Beneish and Roxas models. There were 110 observations in the entire sample. The companies in the sample were those that had received a disclaimer or adverse opinion from the auditors but had not been penalised by the Polish Financial Supervision Authority (KNF Board). In order to minimise the variation in the total asset size, the control firms were chosen according to the industry as determined by the standard industrial classification code and the financial year. The findings show that on the examined sample, the Roxas model demonstrated more accuracy than the Beneish model.[5]

(Serhii L, Tetiana L, Halyna T, & Iryna P, 2021) Using the Beneish model, the essay examines the extent of financial statement fraud in Ukrainian firms. The article's goal is to examine the substance of the modified Beneish model and how it might be used to uncover financial statement fraud and other abuses by Ukrainian firms. The study was predicated on the idea that financial statement fraud of businesses may be identified by applying the Beneish model and its updated version, which was developed in response to better data for its computation. The Beneish model's set of indications for identifying financial statement fraud has been located and examined. The Beneish model with eight factors has been examined in order to determine the values of the. The values of the M-Score (Roxas) have been computed through an analysis of the 5-factor Roxas model. The data has been found and validated to support the unhindered application of the Beneish model, which has been adjusted by Roxas's 5-factor variance, in determining the degree of financial statement fraud. A financial statement fraud detection system based on the Beneish and Roxas models has been created.[6]

[5] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[6] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

(Arshe A & Afreen B, 2023) With 1.17 billion consumers and the second-biggest telecom market in the world, India's telecom industry is expanding rapidly as a result of government initiatives, accessible rates, and low costs. With predictions of 920 million mobile users by 2025 and an economic benefit of $450 billion between 2023 and 2040, the arrival of 5G technology has hastened this expansion. In the field of corporate finance, financial statement manipulation presents a serious problem since it has the ability to deceive stakeholders and investors. This research explores the complex field of financial statement analysis and focuses on five telecom businesses in India, a sector that is critical to the country's economic growth and spans five years, from 2018 to 2022. This study uses the well-known Beneish M-Score Model to look for instances of financial statement fraud in the selected telecom companies.[7]

(Nahid M, Reza T, Akbar A, & Mirfeiz F, 2022) Investor mistrust in the capital markets has been exacerbated by the rise in financial reporting fraud in recent years. As a result, decision-makers who handle financial accounts must be able to predict earnings manipulation accurately. In this study, the Beneish model was built using corporate governance variables, such as the ownership structure requirements, the structure of the board of directors, the audit committee, the legal inspector, and the independent auditor, in order to improve the forecast accuracy of the earning manipulation model.[8]

(Nurina P, Nurmala A, & Ardiansyah S, 2020) The purpose of this study is to evaluate and validate the empirical data using the Beneish Ratio Index for the Financial Distress Prediction Model of Family Businesses in Indonesia. The Indonesian family businesses that are listed on the Indonesia Stock Exchange and have been there since December 31, 2014, serve as the study's sample. Utilising a survey strategy to gather secondary data, a quantitative research methodology was adopted. The Beneish Model components are treated in the same way by the Days Sales in Receivable Index (DSRI), Sales Growth Index (SGI), Sales General and Administrative Index (SGAI), and Leverage Index (LVGI) variables, regardless of the Family Group Company's financial distress situation. The Beneish Model component is treated differently by the Variable Gross Margin Index

[7] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[8] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

(GMI), Asset Quality Index (AQI), Depreciation Index (DEPI), and Total Accruals to Total Assets Index (TATA) depending on the Family Company Group's financial distress condition.[9]

(Spatacean, 2019) The Beneish model is a helpful instrument for evaluating an entity's possibly dishonest activity when it comes to manipulating earnings through false financial reporting. Tarjo ---amp--- Herawati (2015) conducted a study on 35 listed companies that faced fraud allegations between 2001 and 2014. The study used the Financial Supervisory Authority's sanctions database for companies of public interest, or issuers, and came to the conclusion that "the M-score of the Beneish model was generally able to detect financial fraud." Additionally, according to Ahmet Ozcan (2018), a focused study conducted on 174 businesses between 2005 and 2017 revealed that the Beneish model "brings effective value in the analysis of the quantitative characteristics of falsified financial statements."[10]

(G, 2021) This study investigates the possibility of falsified financial statements in Nepal's private commercial banks. This study uses a sample of 16 private commercial banks, including joint ventures, to investigate the feasibility of the Beneish M-score model in identifying potential earning manipulation. A secondary source of information is the publicly available annual reports (income statement and balance sheet) of the relevant institutions for the years 2018 and 2019. The Beneish M-score equation and threshold value of -2.22 are used in this study as analytical tools. [11]

(Deddi H & Cris K, 2023)A research study or scientific publication should incorporate prior or pertinent research. The theory and phenomena pertaining to the link or influence between variables are reinforced by prior research or pertinent studies. The fraud triangle, which is a study of accounting literature using the beneish m-score, is a framework for understanding the factors that influence financial statement fraud. These factors include external pressure (pressure), industry nature (opportunity), and rationalisation (justification). Building a hypothesis about the relationship between variables is the aim of this article, which will be utilised in subsequent studies.[12]

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[9] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[10] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[11] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[12] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian

(H, 2020) There is an increasing chance that financial statements will be distorted. Financial information recipients are paying more attention to the possibility that financial statements would be skewed due to misleading presentation of financial information since the 2008 financial crisis. Scientific research thus focuses increasingly on models that are able to identify financial statement tampering. The purpose of the paper is to introduce the Beneish M-score model's operating principles and its applications to Polish reality. It examines the past performance of over thirty listed firms on the Warsaw Stock Exchange in order to identify those whose past behaviour suggests they may be categorised as manipulators. It also selects an equal number of non-manipulating companies from the control group.The empirical data on firms listed on the Warsaw Stock Exchange are analysed as part of the study methodology.[13]

(Oraka A, Emmanuel I, & John N, 2013) The contribution that SAS 99 made to enhancing the abilities of Nigerian auditors in spotting fraud in corporate organisations' financial statements is duly considered in this paper, which also emphasises how much the Beneish Model could increase auditors' propensity to spot financial statement manipulations. Descriptive and historical research designs were used. The Topman's formula was used to determine the unlimited number of respondents, which included auditors, accountants in the industries, and accounting academics in Anambra and Enugu State. This work was supplemented with data from secondary sources, including the Audited Annual Reports of the top five capitalised manufacturing businesses in Nigeria for the years 2002–2006 (in Cadbury, for the purpose of a model confirmatory test) and 2006–2010.[14]

(Nicholas A, Hussein S, & Emmanuel B, 2023) The purpose of the study was to look into how corporate profitability manipulation affects institutional failures in Ghanaian microfinance. The researchers analysed data on microfinance organisations that covered eight-year intervals, utilising a quantitative investigative technique that they got from the Bank of Ghana (BOG). The sampled data was analysed using the Beneish M- scores model.

Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[13] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[14] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

The Ghanaian microfinance sector's business failures and profits manipulation were discovered to be related by the study[15].

(Ponny H & Ulva R, 2021)Financial condition disclosures given by a corporation that are purposefully rendered erroneous by removing numbers are known as fraudulent financial statements. The purpose of this study was to investigate the impact of utilising the Beneish M-Score model against fraud reports of manufacturing businesses that were listed between 2016 and 2018 on the Indonesian Stock Exchange. 69 companies made up the sample, which was selected by purposeful sampling. The findings indicated that while the Asset Quality Index, Sales Growth Index, Depreciation Index, Sales General and Administrative Expenses Index, and Leverage Index had no effect on fraudulent financial statements, the Days Sales in Receivables Index, Gross Margin Index, and Total Accrual to Total Asset had a significant positive impact on financial statement fraud. Keywords: logistic regression, Beneish, fraud[16]

(Siti M & Anita C, 2022) The purpose of the study is to use the Beneish Model to examine how CEO characteristic characteristics affect signs of financial statement fraud. This study presents six hypotheses that are investigated using logistic regression analysis, which is based on the upper echelon theory. The secondary data used in this study comes from the 2015–2019 Indonesia Stock Exchange financial statements and annual reports of mining businesses. The study's findings demonstrate that the age, educational background, and job experience of the CEO are not reliable markers of financial statement deception. In the meantime, other factors that are still under investigation in this study include the nationality, tenure, and gender of the CEO and their impact on indicators of financial statement fraud.[17]

(Mihalcea, 2020) Econometric models that can identify the risk of financial statement manipulation have been created in the specialized literature to safeguard the interests of stakeholders regarding the company's economic performance. Eight financial rates are used in the Beneish model, which was created by Professor Messod Beneish, to determine a score. In Romania, 55% of the businesses registered on the regulated market of the

[15] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[16] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[17] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

Bucharest Stock Exchange are probably manipulators, according to the average score computed from 1998 to 2017.[18]

(Nugroho, 2020) This study use the Beneish m-score model to identify potential manipulation of profit margins in the PT Garuda Indonesia Tbk period of 2018. The purpose of the study is to identify any potential for manipulating the payment schedule in the PT Garuda Indonesia, Tbk financial statements for the 2018 fiscal year. Based on data analysis results, the company's m-score for its keuangan laporan is -0,49, which is higher than the acuan nilai of -2,22. This suggests that, based on this model, there may be potential for manipulating profit margins in the PT Garuda Indonesia Tbk. keuangan laporan for the 2018 fiscal year. The use of this approach to detect potential manipulation of profits in a company's cash flow is very beneficial to stockholders, investors, and creditors. Keywords: Beneish m-score, manipulation, pendapatan, and keuangan laporan. Summary: In order to identify possible income manipulation on PT Garuda Indonesia's annual financial statement for the year 2018, the research used the Beneish m-score model. Finding evidence of possible income manipulation on the financial statement was the aim of this study.[19]

(Mohamad E, Mohd F, & Azlina A, 2016) To identify financial statement fraud brought on by earnings manipulation, a number of fraud prediction algorithms have been created. One such instrument for financial forensics is the Beneish M-Score model, which is used to assess probable earnings manipulation in financial statements of businesses. According to the United States Securities and Exchange Commission (U.S. SEC), 76% of earnings-manipulating companies were detected by the model and subject to accounting enforcement actions. Additionally, prior to their public disclosure, 71% of the most well-known fake financial reporting scandals in the US were successfully identified by the earnings manipulation model. This study evaluates the validity of the Beneish M-Score model for identifying financial statement fraud and earnings manipulation by publicly traded Malaysian companies before they are made public. The Securities Commission Malaysia (SC) has charged and prosecuted the directors and top management of 17 publicly traded

[18] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[19] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

firms that were involved in fraudulent reporting and misrepresentation between 1996 and 2014, making up the research sample.[20]

(Natalia F & Maria A, 2016) Presently, organizations' stakeholders in Russia and around the world require the tools that allow them to identify financial statement fraud. These types of instruments include the models created by M. Beneish and M. Roxas. These models, however, are unable to account for certain aspects of Russian company practices, accounting standards, and reporting laws. The authors found that the models developed by Beneish and Roxas only detect financial statement fraud in 62% and 58% of cases, respectively, based on a sample of 60 Russian enterprises. Based on data on Russian enterprises, the essay proposes and evaluates a change of the models' benchmarks. The performance of the models Beneish and Roxas provided to identify financial statement fraud is improved by this modification.[21]

(Asia K, Ratan G, & Sadman K, 2022) Objective The purpose of this study is to count the number of businesses that manipulate their earnings. Furthermore, this research has conducted an empirical investigation into the prevalent manipulation items used by the companies. Design, procedure, and strategy For this study, a sample of Bangladesh's listed commercial banks was chosen, and financial data spanning the years 2009 to 2018 was gathered. The sample is split into two groups according to the Beneish model (1999) of likely and nonlikely manipulators. The model's M-score divides the banks into two categories. The Statistical Package for Social Sciences (SPSS) was used to conduct an independent sample t-test in order to determine which factors were the most significant. Results The results demonstrate Bangladeshi banks' erratic practice of fabricating financial reporting. The most alluring factors for creating a fake financial report are overstating revenues, raising intangible assets, decreasing cost, and accruals, according to the results of the t-test. The research findings will assist investors in making informed decisions on potential manipulation in Bangladesh's banking industry. Uniqueness and worth There are a lot of abnormalities in Bangladesh's banking sector, however not many research into forensic accounting and false financial reporting methods have been done. [22]

[20] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[21] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[22] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

(Comporek, 2022) This paper's primary goal is to evaluate how well the eight-factor Beneish model detects financial statement manipulation in publicly traded companies that are listed on the Warsaw Stock Exchange. The study sample is made up of 27 businesses that, between 2006 and 2018, had at least one sanction from the PFSA due to anomalies in their adherence to IAS/IFRS principles. The original Beneish model is characterised by a relatively low degree of usefulness in the selected set of firms, according to empirical investigation. As such, it should be viewed as an average instrument to support the work of statutory auditors, stock exchange investors, and auditors.[23]

(Tarjo & Nurul H, 2015) The purpose of this study is to evaluate m-score Beneish's capacity to identify financial fraud. According to the Financial Services Authority's fraud Database of Sanctions of Issuer Cases Public Companies, which was made available to the public between 2001 and 2014, the companies included in this research data are those that engage in fraud. The outcomes demonstrated the general ability of the Beneish m-score model to identify financial wrongdoing. The indexes of gross margin, depreciation, sales, general administrative load, and total accruals were found to be relevant in the identification of financial fraud. Leverage, sales, and asset quality indices were statistically not significant in identifying financial fraud.[24]

(John N, Emmanuel I, & Oraka A, 1999) The contribution that SAS 99 made to enhancing the abilities of Nigerian auditors in spotting fraud in corporate organisations' financial statements is duly considered in this paper, which also emphasises how much the Beneish Model could increase auditors' propensity to spot financial statement manipulations. Descriptive and historical research designs were used. Using the Topman's formula, 100 respondents—auditors, accountants in the industry, and accounting academics in Anambra and Enugu State—were selected at random. [25]

[23] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[24] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

[25] Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

(Veronika F, Tomasz P, & Tibor T, 2023)Using Beneish's M-score model with eight variables, the study looked at the degree of manipulation of Hungarian business financial statements between 2017 and 2021. The study also looked into whether the area, size and age of the company, and industry type all affected the financial statement manipulations. Every year, 32,024 financial statements made up the research sample. Several groups' M-score values were compared using statistical testing. Over the course of the five years, the percentage of businesses having potentially falsified financial statements ranged from 46.43% to 51.67%. We might conclude that there is a high level of report manipulation by Hungarian enterprises. The results of the analysis demonstrated a considerable improvement in size category five and an improvement in the ratios of likely manipulated (LM) and improbable manipulated (UM) reports for size categories 1-4. The results of the comparison by region showed that more developed regions have lower UM/LM indicators than less developed ones.[26]

(Dragomir D & Milija D, 2017) The purpose of this paper is to highlight the need for the Republic of Serbia to implement more layers of quality control over financial reporting. Internal, external, and state audits, as well as tax control, are not enough controls at the moment to stop and identify business fraud. There have been many instances of fraudulent activity in the past that have supported this belief. Experience has demonstrated that the introduction of forensic accounting is a necessary step in order to provide a level of control and legal authority that permits a more thorough examination of fraud. This article addresses incidents of fraud at specific enterprises in the Republic of Serbia because of this.[27]

[26]Beneish Model, Corporate Governance and Financial Statements Manipulation. (2019). Asian Journal of Accounting and Governance, 12(1), 1–14. https://doi.org/10.17576/ajag-2019-12-05

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3.4 RESEARCH GAP

"Financial Statement Fraud Detection with the Beneish Model: An Empirical Study of Listed Pharmaceutical Companies in India" has a research gap because there aren't many thorough empirical studies that concentrate on the Beneish Model's application in the Indian pharmaceutical sector. The importance of financial statement fraud detection in this industry is well known, but little study has been done on the model's applicability, constraints, and Indian pharmaceutical market setting. Closing this gap will help investors, regulators, and stakeholders improve financial openness and integrity in the pharmaceutical business by offering insightful information about the particular difficulties and trends of earnings manipulation in pharmaceutical companies."

CHAPTER 4

RESEARCH METHODOLOGY

INDEX

4.1 INTRODUCTION

The main focus of the research topic "Financial Statement Fraud Detection with the Beneish Model: An Empirical Study of Listed Pharmaceutical Companies in India" is probably on using the Beneish Model to identify financial statement fraud in the context of Indian listed pharmaceutical companies.

Professor Messod D. Beneish created the Beneish Model, a statistical model intended to identify financial statement fraud or earnings manipulation. It assesses different financial measures and ratios in order to spot irregularities that can point to fraud.

The present study aims to gather financial data from pharmaceutical businesses that are listed in India. The data will be analysed using the Beneish Model to identify any potential symptoms of financial statement fraud. The research attempts to offer practical proof and insights on the frequency and techniques of financial statement fraud in the Indian pharmaceutical business, according to the empirical study component of the project.

In general, it is likely that the research aims to advance knowledge of financial statement fraud detection techniques and offer insightful information to investors, authorities, and legislators involved in the pharmaceutical business in India.

4.2 DETECTING FINANCIAL STATEMENT FRAUD IS CRUCIAL FOR SEVERAL REASONS

1. **Investor Protection:**

   Investors may be duped by financial statement fraud and end up making ill-informed choices about what companies to invest in. Fraud detection promotes openness in the financial markets and shields investors from monetary losses.

2. **Market Integrity:**

   Since fraudulent financial statements misrepresent a company's actual financial situation and performance, they compromise the integrity of the financial markets. Preventing and identifying fraud helps to keep people's faith in the financial system intact.

3. **Corporate Governance**:

   Financial statement fraud can be detected, which draws attention to weaknesses in internal controls and corporate governance. It pushes businesses to implement strong control measures and enhance their governance frameworks in order to stop fraud in the future.

4. **Regulatory Compliance**:

   Fraud detection helps regulatory bodies enforce adherence to rules and accounting standards. It guarantees that businesses retain the quality and dependability of their financial accounts and comply with reporting regulations.

5. **Risk Management**:

   Companies that engage in fraudulent activity run a serious risk of financial losses, legal ramifications, and reputational harm. Companies can successfully reduce these risks and protect their assets and stakeholders' interests by detecting fraud.

6. **Resource Allocation**:

   Financial reporting fraud has the potential to misallocate resources within the economy, taking money away from profitable ventures. By ensuring that resources are distributed effectively and fairly, fraud detection contributes to the growth and development of the economy.

4.3 TITLE OF THE STUDY

Financial Statement Fraud Detection with the Beneish Model: An Empirical Study of Listed Pharmaceutical Companies in India

4.4 OBJECTIVE OF THE STUDY

Research projects must have specific goals in order to guide the researcher on how to proceed. Analyzing an organization's financial performance to determine the condition of its financial health requires a significant amount of effort and a thorough understanding of financial statements. This study’s objective is to bridge this gap using the M-score model.

Listed below are the objectives of the current study:

- To gain knowledge about BENEISH MODEL (M-SCORE MODEL)
- To analyze the financial fraud or status of selected pharmaceutical companies using Beneish model and classify them into zones suggested by Professor M. Daniel Beneish.
- To use the Beneish model to analyse the company's overall performance over the last five years

4.5 CHARACTERISTICS OF GOOD RESEARCH

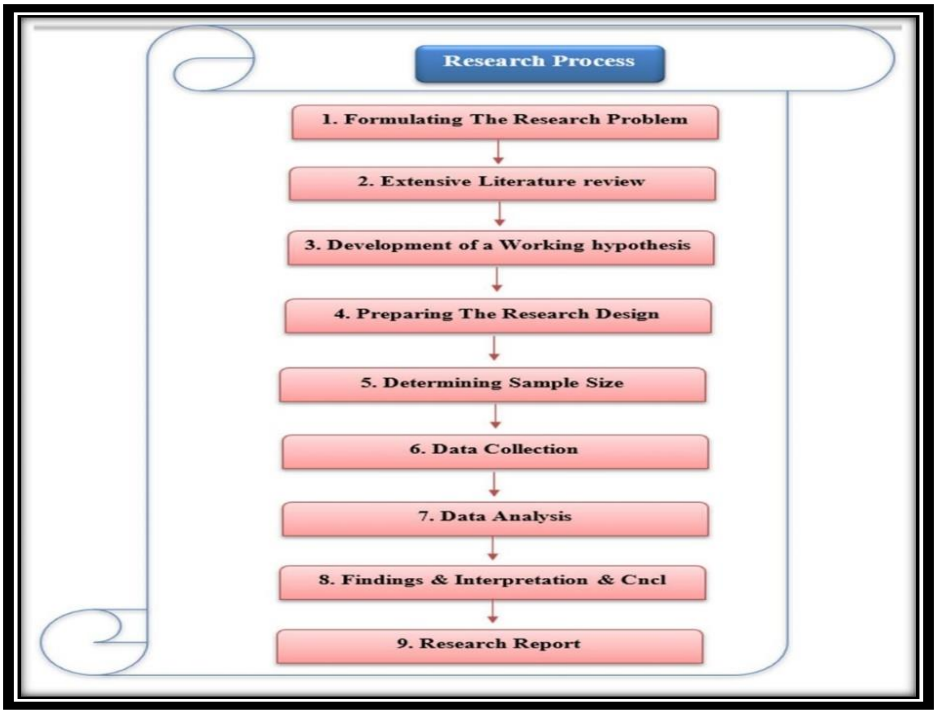
- Clearly specified objectives or research questions serve as a guide for the study and aid in keeping the research efforts focused. This is the foundation of good research.
- Excellent research tackles a major topic that is pertinent to the subject of study or to society at large, such as a knowledge gap, practical issue, or substantial concern.
- Appropriate and rigorous methodologies are used in good research to gather, process, and interpret data. This guarantees the findings' validity, reliability, and generalizability.
- Effective research is open about its procedures, presumptions, and constraints. Scholars furnish comprehensive accounts of their research methodology, data gathering protocols, and analytical methods so that others can evaluate the reliability of the results and conduct a second study if needed.
- Ethical standards and values are upheld by good research, such as the protection of human subjects (if relevant), honesty in reporting findings, and integrity in data collecting and analysis. Participants' informed consent must be obtained, confidentiality must be upheld, and bias and conflicts of interest must be avoided by researchers.
- Empirical evidence from methodical observation, testing, or data collection forms the foundation of good research. Rather than relying on subjective judgements or anecdotal evidence, it uses objective statistics.
- Novel ideas, hypotheses, or empirical discoveries are added to the corpus of knowledge in the field by excellent study. It improves comprehension, encourages more research, and influences practice or policy.

- Well-presented research follows a logical, cohesive, and structured format. In order to improve comprehension, researchers employ appropriate language and graphics in their succinct and clear communication of their findings.
- Thorough study necessitates a critical assessment of current theories, methodologies, and literature. Scholars evaluate the merits and drawbacks of earlier studies, point out information gaps, and suggest novel strategies or fixes.
- Good research is open to revision and refinement based on feedback from peers, reviewers, or stakeholders. Researchers should be willing to reconsider their assumptions, revise their methods, or reinterpret their findings in light of new evidence or perspectives.

4.6 RESEARCH PROCESS

To produce knowledge that will be appreciated by the project and be focused on the relevant issue, a researcher must adhere to a set of structured procedures in the research process. To perform good research, one must comprehend and follow the steps of the research process. Before delving into the particulars of the research methodology and methodologies, it seems prudent to provide a basic summary of the research process.

FIGURE1.11 The research process can be simplified by following these step



(Source: Self-Constructed)

1.Formulating The Research Problem:

The first stage in conducting a scientific investigation is to formulate a broad topic into a particular research problem. After the problem has been articulated widely in the beginning, any ambiguities can be resolved. Then, before attempting a certain remedy, its viability must be taken into account. But care must be taken to guarantee the impartiality and reliability of the background information on the matter. It is accurate, as Professor W.A. Neiswanger states, to say that the problem statement dictates what information will be gathered, what aspects of the information are relevant, what relationships will be investigated, how these relationships will be investigated, and how the final report will be formatted.

2.Extensive Literature Review

After the issue has been located, a succinct explanation has to be recorded. This is the time for the researcher to do a thorough examination of the relevant literature. Both published and unpublished journals are abstracted and indexed in order to achieve this. The first place to look is the bibliography.Depending on the nature of the subject, reviews must be done of books, government papers, academic journals, conference proceedings, and other resources. A quality library will be very helpful to the researcher at this point.

3.Development of a Working Hypothesis

The working hypothesis or hypotheses should be stated in detail by the researcher following a thorough examination of the literature. A working hypothesis is a conjecture generated with the intention of examining and verifying the assumption's logical or empirical ramifications. Thus, developing research hypotheses is an essential effort because they are the main focus of the study. They indirectly affect both the necessary test execution during data analysis and the quality of the data needed for analysis.

4. Preparing The Research Design

The researcher must first clearly define the study problem before developing a research design that includes the conceptual framework that will guide the research. The creation of a design like this facilitates the production of

maximum information by researchers while maintaining maximum efficiency. Stated differently, the aim of study design is to gather pertinent data with the least amount of time, money, and effort. However, the research purpose ultimately dictates how all of this is carried out. Four categories apply to research goals: (i) description, (ii) diagnosis, (iv) experimentation, and (iii) investigation.

5. Determining Sample Design

The collective set of all the things under discussion in any subject of research is referred to as a "population" or "universe". A complete list of every member of the "population" that is being studied is called a census inquiry. It can be presumed that there is no possibility of error and that the utmost degree of accuracy has been attained once every facet of the research has been addressed. A sample design is a planned approach that is selected before any data is gathered with the intention of selecting a sample from a particular population. The researcher must select the sample design while considering the purpose of the study and other pertinent aspects.

6.Data Collection

It is often the case that when faced with a real-world situation, the available data is insufficient and more appropriate data needs to be collected. Accurate data can be gathered in a number of ways, each requiring a different investment of time, money, and other resources from the researcher. One way to collect primary data is by conducting an experiment or survey. Secondary data is information obtained from sources other than the original user. It means that the data, which includes books, journals, periodicals, newspapers, and other secondary data sources, has previously been examined and is accessible. There's a possibility that there may be secondary data that has been released or not.

7. Data Analysis

The process of data analysis is started by the researcher after data collecting. The establishment of categories and the application of these categories to raw data through coding, tabulation, and statistical inference are among the closely connected processes needed for data analysis. The raw data should be arranged by the researcher into a few helpful categories. During the

analysis process, significance tests should be performed on connections or differences that support or contradict original or new hypotheses in order to ascertain the validity of the data.

8.Findings & Interpretation & Conclusion

A hypothesis may be able to be generalised by the researcher if it is tested and verified multiple times. that is, capable of developing a theory. The genuine value of research is reflected in its capacity to make generalisations. The process of interpretation often prompts fresh questions that may lead to further research. A finding in research is an empirical fact that is backed up by data and is not only dependent on opinion, even expert opinion; a conclusion synthesises and interprets the finding and comes to a reasonable conclusion that is in line with the finding.

9.Research Report

The researcher's final task is to compile his results into a report. A well-written report on study procedures, data, and conclusions is called a research report. It is a significant document that informs people about the study process from the standpoint of the researcher and is generally accepted as a reliable source of information. A research report is a succinct synopsis of the study process that highlights findings, recommendations, and other important information. Reading a well-written research report will teach you everything you need to know about the study conducted and the conclusions drawn from it.

4.7 HYPOTHESES OF THE STUDY

When discussing statistical analysis, the terms null hypothesis and alternative hypothesis are frequently used.

Null Hypothesis (H0): There is no significant relationship between the Beneish M-Score, calculated using the variables in the Beneish model, and the occurrence of financial statement fraud in listed pharmaceutical companies in India.

Alternative Hypothesis (H1): There is a significant relationship between the Beneish M-Score and the occurrence of financial statement fraud in listed pharmaceutical companies in India.

This process can be repeated for each variable included in the Beneish model, such as gross margin index, asset quality index, sales growth index, depreciation index, sales and general administrative expenses index, leverage index, and total accruals to total assets.

4.8 PERIOD OF THE STUDY

To guarantee that the research is both significant and practical, it is being carried out over a five-year period, from 2018–19 to 2021-23. If the study time is too short, the results will be inadequate, and if it is too long, data collecting and analysis will become laborious and complex. Therefore, length is considered a crucial aspect in drawing a conclusion.

4.9 SAMPLE OF THE STUDY

Every publicly traded pharmaceutical company is listed on India's main stock exchanges, including the National Stock Exchange of India (NSE) and the Bombay Stock Exchange (BSE). Firms that have made their financial statements available to the public for the last five years (for example, from 2019 to 2023) in order to guarantee a large enough dataset for analysis.Businesses that have made a profit every year for the last five years in order to guarantee stability in their financial performance.

As a result, based on **"total net profit,"** (2022-2023) the researcher selected the top ten pharmaceutical companies listed on the BSE [Bombay Stock Exchange] as a sample from the general population for this study.

Table 4.2 Top 5 Pharmaceutical Companies

NAME OF THE COMPANY	NET PROFIT [RS. CR.]
1. SUN PHARMA	19,845
2 CIPLA	24,013
3. DR. REDDY'S LABS	2,612
4. TORRENT	695
5. ZYDUS	622

4.10 DATA COLLECTION

Decide which sources will be used to get financial data. Publicly accessible sources including financial statements, yearly reports from businesses, regulatory filings (such those made with the Securities and Exchange Board of India, or SEBI), and financial databases may be included in this.Choose a sample of India's listed pharmaceutical businesses based on the sampling criteria specified in the research methodology. This could entail gaining access to databases of publicly traded corporations and sorting them according to particular standards like revenue, market capitalization, or industry categorization.Gather the financial statements for the chosen sample of businesses for the applicable time frame, such as the previous five years. Balance sheets, income statements, and cash flow statements are examples of financial statements that normally contain important financial data required for analysis.Assemble the financial data that has been gathered into an analysis-ready structured manner. To store the data, this can entail building a database or spreadsheet with distinct tabs or tables for every business and financial statement type (such as the income statement and balance sheet).

The main source of data used for this study is **SECONDARY DATA**, which is obtained from the published annual report of selected companies.

4.11 FUTURE SCOPE OF THE STUDY

Determining the study's scope is essential since it enables a researcher to focus on their work within reasonable parameters.

- Researchers can extend the duration of their study to gain a thorough insight of the pharmaceutical sector.
- Researchers can gather a bigger sample of the pharmaceutical business in order to better understand the effects of financial fraud on Indian pharmaceutical companies.
- In this study, the researcher measured financial health using profit, but other measures such as sales and market capitalization can also be employed.
- Financial models are utilised in this study to forecast financial fraud. Accounting-based models can be used by researchers to do additional research and potentially produce more accurate findings.
-

4.12 LIMITATION OF THE STUDY

Although the Beneish Model is a useful instrument for identifying earnings manipulation, researchers and practitioners should be aware of a few of its drawbacks.

- The model makes extensive use of financial statement data, which is rather manipulable by businesses. The model might miss manipulation if a corporation is good at hiding it or if it takes place in non-financial domains.
- The model makes the assumptions that investors respond quickly to fresh information and that markets are efficient. In actuality, investors might not always understand information correctly or promptly, and markets might not always be entirely efficient.
- The primary focus of the Beneish Model is on financial statement indicators, including accruals and earnings quality. Manipulation through non-financial channels, like related party or off-balance sheet transactions, might go undetected by it.
- The criteria and thresholds of the Beneish Model are derived from historical data and might not accurately reflect changing trends or modifications to accounting standards. To maintain the model's relevance over time, it could be required to make constant updates and modifications.

4.13 CHAPTER PLAN

The present study is divided into six chapters, which are as under**:**

- ✓ **Chapter 1 Introduction of The Pharmaceutical Industry**
- ✓ **Chapter 2 Conceptual Framework**
- ✓ **Chapter 3 Literature Review**
- ✓ **Chapter 4 Research Methodology**
- ✓ **Chapter 5 Data Analysis, and Data Interpretation**
- ✓ **Chapter 6 Summary, Findings, and Suggestions**

CHAPTER 1 INTRODUCTION OF THE PHARMACEUTICAL INDUSTRY

The pharmaceutical industry's introduction, which focuses on the creation, production, and distribution of pharmaceuticals, highlights the industry's critical position in healthcare. It draws attention to the dynamic landscape of the sector, which is defined by innovation, strict rules, and large R&D expenditures. The industry helps to enhance the state of world health by addressing a range of medical

requirements, from disease treatment to preventive care. The industry encourages cooperation and competition to push improvements in medical science because it has a wide spectrum of participants, including biotech companies, pharmaceutical companies, and research institutes. All things considered, it emphasises how vital medicines are to solving health issues and improving people's quality of life around the globe.

CHAPTER 2 CONCEPTUAL FRAMEWORK

The Beneish Model theory's conceptual framework includes a multifaceted method for identifying financial statement manipulation. The M-Score is a composite score that is created by combining accounting factors and financial measures. It is used as a predictor of possible manipulation of earnings. The approach looks at things like operating cash flows, financial leverage, and earnings quality to find aberrant financial reporting methods that aren't consistent with regular corporate operations. The parameter for that is total net profit. Moreover, this section describes the vision, mission, business overview, and global footprint of selected companies. Namely, Sun Pharma, Cipla, Dr.Reddy's Laboratories, Torrent Pharma and Zydus.

CHAPTER 3 LITERATURE REVIEW

The Beneish Model theory's literature study includes a thorough analysis of academic publications, empirical research, and real-world applications pertaining to the identification of financial statement earnings manipulation. It summarises research on the efficacy, constraints, and variables affecting the predictive capacity of the model. The model's capacity to detect financial fraud, the ways in which different businesses have applied it, and recommendations for enhancing its precision are among its main features. The review contributes to a thorough knowledge of the Beneish Model's function in financial analysis and regulation by critically evaluating the body of existing research and offering insights into the theoretical underpinnings, empirical support, and practical applications of the model.

CHAPTER 4 RESEARCH METHODOLOGY

The process for conducting research is outlined in the chapter on research technique. The following components make up this chapter: the definition and meaning of research; the purpose of the study; the characteristics of good research; the study's methodology; the objectives and a chapter design, the significance, scope, and

limitations of the study, the title of the study, the duration of the investigation, the sample of the study, the data collection method, the tools and techniques used to analyse the data, and hypotheses.

CHAPTER 5 DATA ANALYSIS & ITS INTERPRETATION

This chapter evaluates the pharmaceutical corporations' financial fraud using the Beneish model. In addition, the investigator looked at every financial element included in the calculation for the Beneish model in this chapter. This chapter addresses the interpretation and examination of the components of the beneish model for each year.

CHAPTER 6 SUMMARY, FINDINGS AND SUGGESTIONS

This concludes the investigation and represents the ultimate result of all the other chapters. This chapter is a summary of the researcher's whole body of work. The study's findings, for which the researcher prepared this dissertation, are then included. Lastly, the investigator presented suggestions in light of the study's conclusions

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CHAPTER 5

DATA ANALYSIS & DATA INTERPRETATION

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5.1 INTRODUCTION

Financial statements are written documents that outline an organization's financial performance and operations. Financial statement analysis is a tool used by both internal and external stakeholders to evaluate an organization's value and performance. In order to generate balance sheets, income statements, and cash flow statements—which provide the basis for financial statement analysis—all organisations must perform financial accounting. Three techniques are used by analysts to review financial statements: ratio analysis, vertical analysis, and horizontal analysis.

Researchers should ideally have a deeper understanding of the rationale for the selection of one statistical method over another in order to obtain greater insights from the data. The primary objective of data exploration and analysis is to discover the most thorough, objective insights. A biassed conclusion might arise from bias or errors in data collection, erroneous analysis technique selection, or sample selection that is not actually representative of the population. Data analysis is used in research to present accurate and trustworthy data. Learn how to handle problems like outliers, missing or altered data, data mining, and data manipulation, and make an effort to reduce statistical errors.

5.2 WHAT IS DATA COLLECTION ?

After a research problem has been determined and a study plan has been devised, the job of gathering data begins. To address the research challenge, information from all pertinent sources must be gathered as part of the data collection procedure. It helps determine how the problem will be resolved. Using the data gathering approaches, one can draw conclusions on the important question's answer. Most organisations employ data collection methods to forecast future trends and probability.

5.3 WHAT IS DATA ANALYSIS?

Following data collection, the information needs to be processed and examined in accordance with the standards set forth in the research plan. Analysis is the process of calculating specific metrics and then looking for links between data sets. The systematic application of logical and/or statistical methods for characterising, summarising, and assessing data is known as data analysis. Businesses may get

useful and accurate information through data analysis, which they can utilise to create future marketing plans and company strategies that help them fulfil their vision and goal.

5.4 WHAT IS DATA INTERPRETATION?

According to the Beneish Model, data interpretation is the process of examining financial data to determine the possibility that a business would manipulate its earnings. Professor Messod Beneish created the Beneish Model, a statistical model that can identify financial fraud or earnings manipulation.

In this case, interpreting data is looking at different financial ratios and indicators to spot oddities or discrepancies that might point to manipulation. Measures of profitability, cash flow, accruals, and other financial indicators are frequently included in these ratios.

Analysts can ascertain whether a company's financial statements have been changed by comparing these ratios to predetermined benchmarks or industry standards. An excessively high accruals to cash flow ratio, for instance, can be a sign of aggressive accounting techniques or earnings management.

In summary, data interpretation in the Beneish Model involves scrutinizing financial data to uncover signs of potential earnings manipulation or financial fraud.

Table 5.1 List of Companies Selected for Analysis Purpose

LIST OF THE COMPANY
1. SUN PHARMA
2. CIPLA
3. DR. REDDY'S LABS
4. Torrent Pharmaceuticals Company
5. Zydus Lifesciences Company

5.5 ANALYSIS OF FINANCIAL COMPONENTS OF M-SCORE MODEL

Messod Beneish created the multi-component M-Score model, which is used to identify financial statement fraud and earnings manipulation. The model evaluates the possibility of fraudulent activity by analysing different financial components. This is the standard analysis for each M-Score model component.

1. **DSRI: Days' sales in a receivable index:**

   This part calculates how accounts receivable have changed over time in relation to sales. A high DSRI could be a symptom of financial manipulation since it suggests that a business is recognising income too quickly. Calculating the ratio of daily sales to accounts receivable and comparing it over time are key components of analysis. Concerns with revenue recognition procedures may arise from an escalating trend or outlier figures.

   DSRI: (Accounts Receivables$_t$/Sales$_t$*Number of Days) / (Accounts Receivables$_{t-1}$/Sales$_{t-1}$*Number of Days)

2. **GMI: Gross margin index**

   GMI evaluates how gross profit margins fluctuate over time. A corporation may be manipulating its cost of goods sold or exaggerating sales in order to artificially enhance profitability if its GMI is decreasing.

   Calculating gross profit margins and comparing them over time or to industry benchmarks is the process of analysis. Considerable departures from past performance or industry standards might necessitate additional research.

   GMI: [Sales$_{t-1}$ – COGS$_{t-1}$)/Sales$_{t-1}$] / [Sales$_t$ – COGS$_t$)/Sales$_t$]

3. **Asset Quality Index (AQI):**

   One way the AQI evaluates changes in asset quality is the ratio of current assets to total assets. A falling AQI could be a sign of aggressive accounting practices like manipulating inventory levels or inflating asset values.

   The ratio of current assets to total assets is calculated and changes over time are evaluated as part of the analysis process. Asset quality ratio abnormalities could be an indication of possible manipulation.

   AQI: [1 – ((Current Assets$_t$ + PP&E$_t$ + Total Long-term

$\text{Investments}_t)/\text{Total Assets}_t)] / [1 – ((\text{Current Assets}_{t-1} + \text{PP\&E}_{t-1} + \text{Total Long-term Investments}_{t-1}) / \text{Total Assets}_{t-1})]$

4. **Sales Growth Index (SGI)**

Sales growth rate is measured by SGI in relation to asset changes and other financial variables. Fast sales growth could be a sign of aggressive revenue recognition or accounting manipulation if it is not accompanied by a comparable increase in assets or productive capability.

Calculating sales growth rates and comparing them to shifts in other financial indicators like equity, liabilities, and assets are key components of analysis. Red flags may be raised by disparities or inconsistencies between sales growth and underlying financial measures.

SGI: $\text{Sales}_t / \text{Sales}_{t-1}$

5. **Depreciation Index (DEPI):**

DEPI evaluates how changes in fixed assets compare to changes in depreciation costs. A falling DEPI could indicate that a business is delaying depreciation costs or prolonging asset lifetimes in order to artificially boost reported earnings.

Depreciation expense ratios are computed and compared to changes in fixed assets over time as part of the analysis process. A sudden drop in DEPI ratios could be a sign that depreciation procedures have been manipulated.

$\text{DEPI}=(\text{Depreciation}_{t-1}/(\text{PP\&E}_{t-1} + \text{Depreciation}_{t-1})) / (\text{Depreciation}_t/(\text{PP\&E}_t + \text{Depreciation}_t))$

6. **Selling, General, & Admin. Expenses Index (SGAI):**

Selling, general, and administrative (SG&A) spending increases are compared to changes in revenue using the SGAI. An growing SGAI could be a sign that a business is exaggerating sales or understating costs in order to falsely increase profitability.

Calculating the ratio of SG&A costs to sales and evaluating variations over time are key components of analysis. An unusual rise in SGAI ratios could indicate that expenditure recognition has been manipulated.

SGAI: $(\text{SG\&A Expense}_t/\text{Sales}_t) / (\text{SG\&A Expense}_{t-1}/\text{Sales}_{t-1})$

7. **Leverage Index (LVGI):**

Leverage ratio variations over time, such as debt-to-equity or debt-to-assets, are measured by LEVI. A high LEVI could indicate that a business is financing its ambitious expansion ambitions with debt, or it could be hiding financial issues.

Calculating leverage ratios and comparing them to historical values or industry benchmarks are key components of analysis. Unusual increases in leverage ratios could give rise to worries about manipulation and stability of the financial system.

LVGI:[(Current Liabilities$_t$ + Total Long-term Debt$_t$)/Total Assets$_t$] / [(Current Liabilities$_{t-1}$ + Total Long-term Debt$_{t-1}$) / Total Assets$_{t-1}$]

8. **Total Accruals to Total Assets (TATA):**

Changes in accruals in relation to total assets are evaluated by TATA. Excessive accruals in comparison to assets could be a sign of manipulating accrual accounts or aggressive earnings management.

Compiling total accruals and comparing them to total assets over time is the analysis process. Unusual increases in TATA ratios could indicate accruals have been manipulated.

TATA: (Income from Continuing Operations$_t$ – Cash Flow from Operations$_t$) / Total Assets$_t$

Table 5.3 Zone Wise Result

Zones	Result
not likely to have manipulated	M< -2.22
likely to have manipulated	M>-2.22

(Source: https://corporatefinanceinstitute.com)

5.6 ANALYSIS OF FINANCIAL COMPONENTS OF SUN PHARMA LTD.

Table 5.3 Financial Component Analysis of Sun Pharma Ltd.

SUN PHARMACEUTICAL INDUSTRIES LTD. (RUPEE IN CRORES)					
FINANCIAL RATIO INDEX	2019	2020	2021	2022	2023
DSRI	3.91166457	0.9007349	1.0032354	0.818787	0.9745506
GMI	1.07957891	-0.712513	1.2315441	0.9841519	0.937605
AQI	3.62332437	-1.264167	0.81461589	0.8319722	1.0394042
SGI	0.2979526	0.5636223	1.51180957	1.1829143	0.9020601
DEPI	1.339174423	1.02392446	0.343086389	0.99247722	0.86531118
SGAI	13.3016075	1.2738733	1.06693037	2.4929146	0.4861901
LVGI	1.16179981	0.8325975	1.36784012	0.5629696	0.9869198
TATA	0.19145094	0.1205744	0.68535783	0.4389072	0.4633995
M SCORE MODEL	4.16908478	-0.640562	4.44282561	0.0001584	2.258351

Table 5.3 shows sun pharmaceutical company's financial components from 2019 to 2023. DAYS' SALES IN A RECEIVABLE INDEX, GROSS MARGIN INDEX,ASSET QUALITY INDEX **,** SALES GROWTH INDEX, DEPRECIATION INDEX, SELLING, GENERAL, & ADMIN. EXPENSES INDEX, LEVERAGE INDEX, TOTAL ACCRUALS TO TOTAL ASSET that the company is doing well. The information supplied comprises different financial ratios for Sun Pharmaceutical Industries Ltd. from 2019 to 2023 that were computed using the Beneish Model hypothesis. Financial statement fraud and possible earnings manipulation are frequently identified using the Beneish Model. Let's examine the information using the Beneish Model's constituent parts. The change in accounts receivable in relation to sales is measured by the DSRI. An aggressive approach to revenue recognition may be indicated by a high DSRI. The DSRI for Sun Pharma has varied over time, peaking at 3.912 in 2019 and sharply declining to 0.901 in 2020. GMI evaluates adjustments to gross profit margins. Negative figures could be a sign of possible manipulation of earnings. The GMI for Sun Pharma varied; in 2020, it had a negative value (-0.713), suggesting possible manipulation. Changes in asset quality are assessed using

AQI. Values that are negative could indicate possible tampering. The AQI for Sun Pharma varied, showing negative numbers in 2020 and 2021.Changes in SG&A costs in relation to sales are measured by the SGAI. Elevated numbers can suggest possible tampering. Sun Pharma's SGAI varied between 0.486 and 13.302, with a notable increase in 2022 that would suggest greater SG&A costs in comparison to sales. Leverage ratio variations are assessed using the LVGI. Extreme values could be a sign of manipulation or financial hardship. Sun Pharma had an LVGI that varied throughout time, ranging from 0.563 to 1.368. Changes in accruals in relation to assets are evaluated by the TATA. Elevated numbers can suggest possible tampering. Sun Pharma's TATA had varying levels over time, ranging from 0.120 to 0.685. The M-Score is the sum of the individual components and is used to assess the likelihood of earnings manipulation. Sun Pharma's M-Score ranged from -0.641 to 4.443, indicating fluctuations in the likelihood of manipulation over the years.

According to the statistics, there may have been manipulation of Sun Pharma's financial ratios at some point in the past, especially in 2020 and 2022, as shown by the company's negative GMI and AQI numbers. To determine the underlying causes of these variations and evaluate the company's financial integrity, more investigation is necessary.

5.3.1 Table Showing Days' sales in a receivable index Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD.(RUPEE IN CRORES)					
PARTICULAR	2019	2020	2021	2022	2023
ACCOUNT RECEIVBLE	33,544	34042	34934	33007	36520
SALES	29,066	32,838	33498	38655	43886
NUMBER OF DAYS	365	366	365	365	365
DSRI	3.91166457	0.90073494	1.0032354	0.818787008	0.974550604

5.3.2 Table Showing Gross margin index Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD.(RUPEE IN CRORES)					
PARTICULAR	2019	2020	2021	2022	2023
SALES	29,066	32,838	33498	38655	43886
COGS	57,827	55,152	61,531	70,491	77,775
SALES T1	2,64,894	29,066	32,838	33498	38655
COGS T1	22,101	57,827	55,152	61,531	70,491
T	0.989506	0.705036	-0.83686	-0.82359	-0.77221
T1	0.916567	-0.98951	-0.67952	-0.83686	-0.82359
GMI	1.079579	-0.71251	1.231544	0.984152	0.937605

5.3.3 Table Showing ASSET QUALITY INDEX Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD.(RUPEE IN CRORES)					
PARTICULAR	2019	2020	2021	2022	2023
Current Assets	1,37,296	1,59,477	1,42,965	1,76,562	1,99,763
PP&E	47,092.10	49,103.10	48,739.80	49,695.70	47,332.50
Total Long-term Investments	37,092	50,027	62,218	49,485	50,680
Total Assets	3,77,141	3,83,103.00	3,89,988	4,07,654	4,09,874
AQI	0.451986983	1.131202342	0.919094193	1.180240731	1.092098007

5.3.4 Table Showing Sales Growth Index Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD. (RUPEE IN CRORES)					
PARTICULAR	2019	2020	2021	2022	2023
SALES	2,90,659	32,838	33498	38655	43886
T1	2,64,894	29,066	32,838	33,498	38,655
SGI	1.09726532	1.129774	1.020099	1.153949	1.135325

5.3.5 Table Showing Depreciation Index Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD. (RUPEE IN CRORES)					
PARTICULAR	2019	2020	2021	2022	2023
DEPRICIATION	5,529	5,615	20,799	21,437	25,294
PP&E	47,092.10	49,103.10	48,739.80	49,695.70	47,332.50
DEPRICIATION1	14,998	5,529	5,615	20,799	21,437
PP&E1	91,590.30	47,092.10	49,103.10	48,739.80	49,695.70
DEPI	1.339174	1.023924	0.343086	0.992477	0.865311

5.3.6 Table Showing SELLING, GENERAL, & ADMIN. EXPENSES INDEX Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD. (RUPEE IN CRORES)					
PARTICULAR	**2019**	**2020**	**2021**	**2022**	**2023**
Selling, General and Admin expenses (SG&A	19,939	28,696	31,232	89,845	49,593
SALES	29,066	32,838	33498	38655	43886
T	0.685991	0.873866	0.932354	2.3242789	1.130041
T1	0.051572	0.685991	0.873866	0.932354	2.324279
SGAI	13.30161	1.273873	1.06693	2.492915	0.48619

5.3.7 Table Showing Leverage Index, Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD. (RUPEE IN CRORES)					
PARTICULAR	2019	2020	2021	2022	2023
Current Liabilities	1,32,718	1,12,037	1,61,456	1,72,084	1,99,063
Total Long-term Debt	14,225	12,566	8,981	2,299	0
Total Assets	3,77,141	3,84,103	3,84,103	6,98,077	8,07,435
LVGI	1.1618	0.832597	1.36784	0.56297	0.98692

5.3.8 Table Showing Total Accruals to Total ASSET, Analysis of Sun Pharma

SUN PHARMACEUTICAL INDUSTRIES LTD. (RUPEE IN CRORES)					
PARTICULAR	**2019**	**2020**	**2021**	**2022**	**2023**
Income from Continuing Operations	1,03,032	1,25,319	3,34,981	3,86,544	4,38,856
Cash Flow from Operations	30,828	79,006	71,733	80,153	64,691
TOTAL ASSET	3,77,141	3,84,103	3,84,103	6,98,077	8,07,435
TATA	0.191451	0.120574	0.685358	0.438907	0.4634

INTERPRETATION

The information supplied includes financial ratios for Sun Pharmaceutical Industries Ltd. from 2019 to 2023 that were calculated using the Beneish Model. The Days' Sales in Receivables Index, or DSRI, shows a downward trend, which could mean improved receivables management effectiveness. Variations in asset quality and possible manipulation of earnings are indicated by fluctuations in the AQI (Asset Quality Index) and GMI (Gross Margin Index), respectively. The Sales Growth Index (SGI) peaks in 2021, which could mean that revenue recognition is being aggressively done. While the Sales, General, and Administrative Expenses Index (SGAI) declines, potentially indicating better expense management, the Depreciation Index (DEPI) stays constant. Not only does TATA (Total Accruals to Total Assets) fluctuate, but the LVGI (Leverage Index) does as well. The chance of financial statement manipulation varies over time, according to the M-Score Model.

5.7 ANALYSIS OF FINANCIAL COMPONENTS OF CIPLA.

5.4 Table Showing, BENEISH MODEL Analysis of CIPLA

CIPLA					
FINANCIAL RATIO INDEX	2019	2020	2021	2022	2023
DSRI	0.83943049	0.643076	1.39546622	0.8105244	0.9886668
GMI	3.27503908	1.0087505	1.0005614	1.0010357	1.0156584
AQI	1.08736409	0.9412676	1.00315065	1.8289764	1.0624721
SGI	1.109288	1.04706	1.118374	1.135855	1.04549
DEPI	0.96739086	1.0486199	1.04617802	1.0516538	0.8763526
SGAI	0.357491	1.7327704	1.09437799	0.7795768	0.9311761
LVGI	1.69935039	0.9009375	0.41035987	1.5431225	1.0269619
TATA	0.57113049	0.540022	0.61821191	0.5823575	0.6617468
M SCORE MODEL	10.689253	1.096519	-0.3910728	4.811084	2.0516829

(Source: cipla.com)

INTERPRETATION

Table 5.4 shows CIPLA financial components from 2019 to 2023.The Beneish Model, sometimes referred to as the M-Score model, is a financial model that is employed to detect possible manipulation of earnings in a corporation. The methodology attempts to evaluate the possibility of financial reporting fraud by looking at several financial ratios. Let's use the Beneish Model to examine the data for CIPLA LTD. from 2019 to 2023. The DSRI calculates a company's aggressive revenue recognition. A greater DSRI could be a symptom of aggressive revenue recognition, which could be a code word for manipulating earnings. CIPLA LTD. displays a DSRI of 1.395 in 2021, which is much higher than in previous years. This implies that there may have been a pushy revenue recognition policy in place at the time. The gross margin's divergence from the industry standard is assessed by GMI. Unusual high GMI numbers could indicate gross margin manipulation

used to manipulate earnings. With a GMI of 3.275 in 2019, CIPLA LTD. has abnormally high gross margins in comparison to the industry standard. A company's asset quality is reflected in its AQI. A higher AQI could be an indication of manipulation or of poorer asset quality. The AQI for CIPLA LTD. jumps to 1.829 in 2022, indicating a decline in asset quality during that time. SGI calculates the growth rate of sales. Significant departures from standard industry practices may suggest manipulation. The SGI of CIPLA LTD. varies throughout time, showing a significant uptick in 2021 that would indicate artificially inflated sales growth. The DEPI calculates the deviation of depreciation charges from industry standards. A reduced DEPI could be a sign of possible manipulation due to lower depreciation costs. CIPLA LTD.'s DEPI lowers sharply to 0.876 in 2023, indicating a possible tactic to manipulate profitability by cutting depreciation costs. The growth rate of selling, general, and administrative expenses is assessed by SGAI. Growth rates that are abnormal might point to manipulation. With a score of 1.733 in 2020, CIPLA LTD.'s SGAI shows a significant increase, indicating possible manipulation through increased spending growth. LVGI calculates how much leverage the business is using. Excessive leverage could be a sign of manipulation to overstate earnings or financial hardship. The LVGI of CIPLA LTD. varies significantly over time. With an LVGI of 1.699 in 2019, the corporation appears to be using a lot of leverage. This high level of leverage may increase the possibility of manipulating earnings. But in 2021, the LVGI falls precipitously to 0.410, indicating a substantial decline in leverage. By lowering its leverage, CIPLA LTD may be less vulnerable to manipulation of earnings or financial difficulties. In the years that follow, LVGI exhibits some volatility but mostly stays in a reasonable range, suggesting that the company's leverage position is rather steady. The percentage of accruals in total assets is measured by TATA. Elevated TATA readings could indicate that accruals were used to manipulate earnings. The TATA of CIPLA LTD. has been comparatively steady throughout time, ranging from 0.540 to 0.662. This stability points to the company's accrual methods being stable, with no notable variances that could point to accrual manipulation.

With a notably high M-Score of 10.689 in 2019, CIPLA LTD. may be more vulnerable to earnings manipulation as a result of unusually high gross margins (GMI) and excessive leverage (LVGI).2020 sees a significant drop in the M-Score

to 1.097, indicating a possible fall in SGAI and LVGI and a consequent decrease in the likelihood of manipulation.The M-Score turns negative (-0.391) in 2021, suggesting a possible reversal of manipulation or a drop in probability. Decreased LVGI and enhanced DEPI may have an impact on this decline.The M-Score rises in 2022 and 2023 but stays below 2019 levels, indicating a moderate risk of manipulation. Variations in the SGAI and DEPI are among the factors that increase this risk. Finally, the financial indicators for CIPLA LTD. point to different degrees of manipulation risk throughout time. While some ratios, like SGAI and DEPI, fluctuate significantly, other ratios, including TATA and LVGI, stay mostly steady. The M-Score offers a thorough evaluation of manipulation risk and incorporates a number of financial ratios to direct more research and study.

5.4.1 TABLE SHOWING DAYS' SALES IN A RECEIVABLE INDEX ANALYSIS OF CIPLA

CIPLA					
PARTICULAR	2019	2020	2021	2022	2023
ACCOUNT RECEIVBLE	2,888.49	1,939.62	3,035.37	2,794.48	2,888.49
SALES	16,362	17,132	19160	21,763	22753
NUMBER OF DAYS	365	366	365	365	365
DSRI	0.839430491	0.643076018	1.39546622	0.810524368	0.988666781

The DSRI for 2019 is 0.839, meaning that the average time it takes the business to recover its accounts receivable is 0.839 days. The DSRI drops to 0.643 in 2020, indicating that receivables collection efficiency has improved. When compared to sales, the 2021 DSRI shows a steep increase to 1.395, suggesting a slower rate of accounts receivable collection. The 2022 DSRI shows increased efficiency as it drops to 0.811 once more.

5.4.2 TABLE SHOWING GROSS MARGIN INDEX ANALYSIS OF CIPLA

CIPLA					
PARTICULAR	2019	2020	2021	2022	2023
SALES	16,362	17,132	19160	21,763	22753
COGS	4,285	4,376	4,886	5,533	5,519
SALES T1	4,264	16,362	17,132	19160	21,763
COGS 2	3,303	4,285	4,376	4,886	5,533
GMI	3.275039	1.008751	1.000561	1.001036	1.015658

The GMI for 2019 is 3.275, which is extraordinarily high and indicates gross margins that are much greater than the industry average.2020 sees a dramatic decline in GMI to 1.009, indicating a tighter alignment of gross margins with industry norms. Gross margin stability is indicated by the GMI in 2021, which stays near to industry standards at 1.001. The GMI shows a minor departure from industry standards but overall stability in 2022 and 2023, rising to 1.001 and 1.016.

5.4.3 TABLE SHOWING ASSET QUALITY INDEX ANALYSIS OF CIPLA

PARTICULAR	2019	2020	2021	2022	2023
Current Assets	12,424	11,703	11,942	25,449	27,596
PP&E	5,114	4,805	4,618	4,838	4,583
Total Long-term Investments	193	219	195	309	481
Total Assets	23,963	23,662	25,151	14,710	16,805
AQI	1.08736409	0.94126756	1.00315064	1.82897644	1.062472054

In 2019, AQI is at 1.087, suggesting relatively excellent asset quality. The AQI drops to 0.941 in 2020, suggesting that asset quality may be declining. The AQI shows a little improvement in 2021, rising to 1.003. The AQI peaks at 1.829 in 2022, suggesting a severe decline in asset quality, possibly as a result of a current

asset increase that is out of proportion to total assets. In 2023, AQI declines to 1.062, reflecting a modest recovery in asset quality.

5.4.4 TABLE SHOWING SALES GROWTH INDEX ANALYSIS OF CIPLA

CIPLA					
PARTICULAR	2019	2020	2021	2022	2023
SALES	16,362	17,132	19160	21,763	22753
T1	14,750	16,362	17,132	19,160	21,763
SGI	1.109288	1.04706	1.118374	1.135855	1.04549

SGI is 1.109 in 2019, which is a growth rate of almost 10.9% from the prior year.SGI drops to 1.047 in 2020, indicating a reduced growth rate of roughly 4.7%.SGI rises little to 1.118 in 2021, suggesting a moderate improvement in sales growth to roughly 11.8%.SGI rises to 1.136 in 2022, indicating a growth rate of almost 13.6% and a sustained growth trend. SGI drops to 1.045 in 2023, suggesting a minor deceleration in sales growth to roughly 4.5%.

5.4.5 TABLE SHOWING DEPRECIATION INDEX ANALYSIS OF CIPLA

CIPLA					
PARTICULAR	2019	2020	2021	2022	2023
DEPRICIATION	1,326	1,174	1,067	1,051	1,172
PP&E	5,114	4,805	4,618	4,838	4,583
DEPRICIATION1	1,322	1,326	1,174	1,067	1,051
PP&E1	5,315	5,114	4,805	4,618	4,838
DEPI	0.967391	1.04862	1.046178	1.051654	0.876353

With a DEPI of 0.967 in 2019, depreciation costs are marginally less than anticipated in relation to the value of PP&E assets.DEPI rises to 1.049 in 2020, indicating that depreciation costs are somewhat greater than anticipated when compared to PP&E assets.DEPI stays comparatively steady in 2021 at 1.046, suggesting that depreciation costs are within budget.DEPI rises marginally to 1.052 in 2022, suggesting that depreciation costs are somewhat greater than anticipated in relation to PP&E assets.DEPI drops to 0.876

in 2023, indicating a notable decline in depreciation costs in comparison to PP&E assets and possibly pointing to a shift in asset values or depreciation policy.

5.4.6 TABLE SHOWING SELLING, GENERAL, & ADMIN. EXPENSES INDEX ANALYSIS OF CIPLA

CIPLA					
PARTICULAR	**2019**	**2020**	**2021**	**2022**	**2023**
Selling, General and Admin expenses (SG&A	1,691	3,068	3,755	3,325	3,237
SALES	16,362	17,132	19160	21,763	22753
SGAI	0.357491	1.73277	1.094378	0.779577	0.931176

With an SGAI of 0.357 in 2019, SG&A costs are comparatively modest when measured against sales.By 2020, SGAI rises to 1.733, indicating a notable increase in SG&A expenditures in relation to sales, perhaps as a result of higher operating costs or expansion initiatives.The SGAI falls to 1.094 in 2021, showing a moderating trend in the growth rate of SG&A expenditures relative to sales.The SGAI falls to 0.780 in 2022, indicating a possible reduction in SG&A spending as a percentage of sales as a result of efficiency gains or cost-cutting initiatives.The SGAI marginally rises to 0.931 in 2023, suggesting a minor increase in SG&A costs in comparison to sales.

5.4.7 TABLE SHOWING LEVERAGE INDEX ANALYSIS OF CIPLA

CIPLA					
PARTICULAR	2019	2020	2021	2022	2023
Current Liabilities	3,771	4,393	2,691	4,912	5,033
Total Long-term Debt	3,830	2,369	0	416	0
Total Assets	23,963	23,662	22,963	29,463	27,101
LVGI	1.69935	0.900937	0.41036	1.543122	1.026962

The 2019 LVGI of 1.699 indicates a comparatively high degree of leverage and greater debt compared to the company's assets. The LVGI drops to 0.901 in 2020, a considerable declin from the year before, suggesting a decrease in leverage, perhaps as a result of lower borrowing or debt payback. The LVGI drops further lower in 2021, to 0.410, indicating a considerable reduction in leverage and possibly a major decline in debt or growth in asset

base. When the LVGI rises to 1.543 in 2022, it suggests a moderate increase in leverage, which could be brought on by higher borrowing or a decline in total assets. LVGI drops somewhat to 1.027 in 2023, suggesting a marginal decrease in leverage from the year before.

5.4.8 TABLE SHOWING TOTAL ACCRUALS TO TOTAL ASSETS ANALYSIS OF CIPLA

PARTICULAR	2019	2020	2021	2022	2023
Income from Continuing Operations	15,970	16,694	18,988	21,623	22,473
Cash Flow from Operations	2,284	3,916	4,792	4,465	4,539
TOTAL ASSET	23,963	23,662	22,963	29,463	27,101
TATA	0.57113	0.540022	0.618212	0.582358	0.661747

The TATA ratio for 2019 was 0.571, which indicates that accruals financed almost 57.1% of the company's total assets. The ratio marginally dropped to 0.540 in 2020, meaning that accruals financed roughly 54.0% of total assets. By 2021, the ratio had risen to 0.618, indicating that accruals financed approximately 61.8% of total assets. By 2022, accruals financed about 58.2% of total assets, according to the ratio, which dropped to 0.582. The ratio climbed dramatically to 0.662 in 2023, meaning that accruals financed around 66.2% of total assets.

5.8 ANALYSIS OF FINANCIAL COMPONENTS OF DR. REDDY'S LABS.

5.5 Table Showing, BENEISH MODEL Analysis of DR. REDDY'S LABS

DR. REDDY'S LABS					
FINANCIAL RATIO INDEX	2019	2020	2021	2022	2023
DSRI	0.8825491	1.1142611	8.61974543	0.1430854	0.7388833
GMI	1.06660713	0.9887447	-4.6817873	-0.1725234	1.1690974
AQI	1.03562013	1.0845182	1.10965718	1.1756372	1.1504477
SGI	1.114684	1.134864	0.049243	1.150732	1.173731
DEPI	4.38036139	0.9584864	0.99087213	1.0262319	1.0632633
SGAI	0.93407106	0.9073913	22.1384612	0.0703358	0.9335722
LVGI	0.86418349	0.8773619	1.06830165	0.8924994	1.1299207
TATA	0.53832081	0.5951441	0.56143523	0.6047924	0.6048213
M SCORE MODEL	1.79607749	1.6218082	1.8536915	0.379088	2.6125834

INTERPRETATION

Professor Messod Beneish created the Beneish model, a method that looks at a number of financial parameters to identify potential profits manipulation. Each of the eight financial ratios in the model is intended to represent a distinct facet of financial statement manipulation. The duration it takes a business to recover its accounts receivable is measured by DSRI. The DSRI for 2021 is remarkably high (8.62), suggesting a notable rise in the duration required by Dr. Reddy's Labs to collect its receivables in contrast to prior years. If the business is delaying the recognition of revenue in order to inflate reported profitability, this could indicate possible manipulation. According to its rivals in the industry, the company's gross margin is evaluated by GMI. In comparison to prior years, 2021's GMI is negative

(-4.68), indicating a significant drop in gross margin. If the corporation is manipulating its reported profits by artificially inflating revenues or deflating the cost of goods sold, a large negative figure could indicate possible manipulation. The ratio of high-quality assets to total assets is how the AQI calculates the quality of a company's assets. The AQI for 2019 was 1.036, which suggests that asset quality is generally good. The AQI showed a consistent upward trend over time, peaking at 1.150 in 2023, indicating an improvement in asset quality over time. The SGI evaluates a company's sales growth's sustainability and regularity.The SGI was above 1 in 2019 and 2020, indicating a positive growth in sales.The SGI did, however, sharply plummet to 0.049 in 2021, indicating a negative growth in sales.In 2022 and 2023, the SGI recovered, suggesting that sales growth had improved. The ratio of the market value of equity to the book value of all liabilities is known as the LVGI. A higher leverage ratio (LVGI) denotes higher leverage, or more debt compared to equity for the company. According to the Beneish Model, organisations with high levels of debt may face pressure to achieve investor expectations or debt covenants, which could lead to increased motivation for earnings manipulation. Consequently, higher leverage is associated with higher financial risk. With an LVGI of 0.864 in 2019, moderate leverage is indicated.

It rises somewhat to 0.877 in 2020.It rises to 1.068 in 2021, indicating a notable increase in leverage. It falls to 0.892 in 2022. It increases once more to 1.130 in 2023. TATA stays mostly constant over time, varying between 0.538 and 0.605. Since accruals can still be altered within a stable framework, this stability does not necessarily rule out the possibility of earnings manipulation, even though it may suggest a consistent accounting strategy.

Variations in the M-Score over time show different degrees of risk related to earnings manipulation.
A higher M-Score for 2019, 2021, and 2023 points to a possible link between underlying financial conditions and accounting methods and an increased risk of earnings manipulation in those years.

On the other hand, 2020 and 2022's lower M-Scores might point to a lower chance of manipulation during those years.

5.5.1 TABLE SHOWING DAYS' SALES IN A RECEIVABLE INDEX ANALYSIS OF DR. REDY'S

DR. REDDY'S LABS					
PARTICULAR	2019	2020	2021	2022	2023
ACCOUNT RECEIVBLE	39,869	50,278	21400	49,454	42,889
SALES	1,53,851	1,74,600	8,598	1,38,864	1,62,989
NUMBER OF DAYS	365	366	365	365	365

(SOURCE: COMPUTED FROM EXCEL)

The typical time it takes a business to get paid after making a sale is gauged by the Days Sales in Receivables (DSR) index. Due to larger account receivables compared to revenues, Dr. Reddy's Labs had a DSR of around 25 days in 2019 (39,869/1,53,851 * 365). This number grew in 2020 and 2022. But in 2021, there's a noticeable decline, maybe as a result of less credit sales or increased collection efficiency. The small increase in 2023 points to a return to a more conventional pattern of collection. All things considered, variations in DSR point to shifts in the business's capacity for effective payment collection.

5.5.2 TABLE SHOWING GROSS MARGIN INDEX ANALYSIS OF DR. REDY'S LABS

DR. REDDY'S LABS					
PARTICULAR	2019	2020	2021	2022	2023
SALES	1,53,851	1,74,600	8,598	1,38,864	1,62,989
COGS	21,032	25,565	42,958	43,124	31,614
SALES 1	1,38,022	1,53,851	1,74,600	8,598	1,38,864
COGS 2	26,309	21,032	25,565	42,958	43,124
GMI	1.066607	0.988745	-4.681787	-0.172523	1.169097

(SOURCE: COMPUTED FROM EXCEL)

5.5.3 TABLE SHOWING ASSET QUALITY INDEX ANALYSIS OF DR.REDY'S LABS

DR. REDDY'S LABS					
PARTICULAR	2019	2020	2021	2022	2023
Current Assets	1,11,101	1,25,991	1,45,503	1,77,823	2,04,255
PP&E	49,127	47,779	47,322	48,869	56,542
Total Long-term Investments	813	23,687	4,958	20,173	44,496
Total Assets	2,24,656	2,32,253	2,66,168	2,97,469	3,22,851
AQI	1.035620127	1.084518227	1.109657181	1.175637202	1.150447692

(SOURCE: COMPUTED FROM EXCEL)

The Gross Margin Index (GMI) compares variations in gross margin over time to determine the trend in a company's profitability. Dr. Reddy's Laboratories saw increases in profitability in 2019 and 2023; GMI numbers above 1 show higher gross margins than the year before. GMI values below 1 indicate a deterioration in profitability in 2020 and 2022, which may have been brought on by higher.

The percentage of a company's assets that are liquid or readily convertible into cash is measured by the Asset Quality Index (AQI). From 2019 to 2022, Dr. Reddy's Labs' AQI increased steadily, a sign of better asset quality and a larger ratio of current assets to total assets. This pattern indicates the company's capacity to make investments in prospects or fulfil short-term commitments. The AQI does, however, slightly decline in 2023, suggesting either a relative decline in liquidity or an increase in long-term investments relative to current assets, which may be the result of strategic adjustments or investment choices

5.5.4 TABLE SHOWING SALES GROWTH INDEX ANALYSIS OF DR.REDY'S LABS

PARTICULAR	2019	2020	2021	2022	2023
SALES	1,53,851	1,74,600	8,598	1,38,864	1,62,989
T1	1,38,022	1,53,851	1,74,600	8,598	1,38,864
SGI	1.114684	1.134864	0.049243	1.150732	1.173731

(SOURCE: COMPUTED FROM EXCEL)

The rate at which a company's sales fluctuate over time is shown by the Sales Growth Index (SGI). From 2019 to 2022, Dr. Reddy's Labs' sales increased steadily, as seen by SGI values greater than 1, which indicate positive sales growth. However, the SGI value of 0.049243 in 2021 indicates a severe reduction in sales, indicating a sharp decline in sales compared to the prior year. Numerous variables, including market conditions, regulatory concerns, and internal challenges, could be responsible for this downturn. With SGI values over 1, the ensuing recovery in 2022 and 2023 shows a resumption to the growth track.

5.5.5TABLE SHOWING DEPRECIATION INDEX ANALYSIS OF DR.REDY'S LABS

PARTICULAR	2019	2020	2021	2022	2023
DEPRICIATION	11,348	11,631	11,652	11,652	12,502
PP&E	49,127	47,779	47,322	48,869	56,542
DEPRICIATION1	49,733	11,348	11,631	11,652	11,652
PP&E1	10,772	49,127	47,779	47,322	48,869
DEPI	4.380361	0.958486	0.990872	1.026232	1.063263

(SOURCE: COMPUTED FROM EXCEL)

The percentage of a company's property, plant, and equipment (PP&E) that is depreciating in relation to its total PP&E is measured by the Depreciation Index (DEPI). With a DEPI of 4.38 in 2019, Dr. Reddy's Laboratories was found to have aggressive depreciation or high asset write-offs, as evidenced by the fact that depreciation expense surpassed PP&E value. The pattern becomes more normalised in the following years, with DEPI values approaching 1, indicating that depreciation costs are commensurate with PP&E. 2020's low DEPI value suggests that, perhaps as a result of reduced investment in new assets or

adjustments to accounting procedures, depreciation expense was much less than the value of PP&E in that year.

5.5.6 TABLE SHOWING SELLING, GENERAL, & ADMIN. EXPENSES INDEX ANALYSIS OF DR.REDY'S LABS

DR. REDDY'S LABS					
PARTICULAR	2019	2020	2021	2022	2023
Selling, General and Admin expenses (SG&A	48,680	50,129	54,650	62,081	68,026
SALES	1,53,851	1,74,600	8,598	1,38,864	1,62,989
SGAI	0.934071	0.907391	22.13846	0.070336	0.933572

(SOURCE: COMPUTED FROM EXCEL)

The Selling, General, and Administrative Expenses Index (SGAI) indicates the efficiency of a company in managing its selling, general, and administrative expenses relative to its sales. In 2019 and 2023, Dr. Reddy's Labs maintained relatively stable SGAI values around 0.93, suggesting a consistent proportion of expenses to sales. However, in 2020, there was a slight decrease in SGAI, indicating a relatively lower proportion of expenses to sales, possibly due to cost-cutting measures or improved operational efficiency. The significant spike in SGAI in 2021 to 22.14 suggests an anomaly, possibly caused by extraordinary expenses or inaccuracies in financial reporting, given that the ratio exceeds 1. Subsequent to this anomaly, SGAI returned to a more typical range in 2022. Overall, SGAI helps assess the effectiveness of cost management and operational efficiency in relation to revenue generation.

5.5.7 TABLE SHOWING LEVERAGE INDEX (LVGI) ANALYSIS OF DR.REDY'S LABS

DR. REDDY'S LABS					
PARTICULAR	2019	2020	2021	2022	2023
Current Liabilities	58,973	72,141	83,391	83,391	94,015
Total Long-term Debt	22,000	1,304	6,299	6,299	5,746
Total Assets	2,24,656	2,32,253	2,65,491	2,97,469	2,92,827
LVGI	0.864183	0.877362	1.068302	0.892499	1.129921

(SOURCE: COMPUTED FROM EXCEL)

The Leverage Index (LVGI) compares the total assets to the equity of a company in order to assess its financial leverage. Dr. Reddy's Labs had LVGI values below 1 in 2019 and 2020, which suggests a lower level of financial leverage because the company had greater equity compared to its total assets. The LVGI did, however, rise to 1.068 in 2021, suggesting a minor increase in financial leverage—possibly due to higher borrowing or lower equity. The LVGI fell in 2022, indicating a potential decrease in financial leverage as a result of equity injection or debt payback. The LVGI's subsequent increase in 2023 suggests a rise in financial leverage, which may be explained by a number of ways, including higher borrowing for investment or expansion purposes.

5.5.8 TABLE SHOWING TOTAL ACCRUALS TO TOTAL ASSETS ANALYSIS OF DR.REDY'S LABS

PARTICULAR	**2019**	**2020**	**2021**	**2022**	**2023**
Income from Continuing Operations	1,54,482	1,75,170	1,90,475	2,15,452	2,46,697
Cash Flow from Operations	33,545	36,946	41,419	35,545	69,589
TOTAL ASSET	2,24,656	2,32,253	2,65,491	2,97,469	2,92,827
TATA	0.538321	0.595144	0.561435	0.604792	0.604821

(SOURCE: COMPUTED FROM EXCEL)

The ratio known as Total Accruals to Total Assets, or TATA, quantifies the degree to which accrual accounting as opposed to cash transactions—drives a company's earnings. With a TATA ratio of 0.538 in 2019, Dr. Reddy's Labs was able to demonstrate that a sizeable amount of their revenue came from non-cash accruals. This implies that profits that are mostly derived from non-cash transactions could not be as stable or consistent. The TATA ratio fluctuates in the following years, with values varying from 0.561 to 0.605. These variations can be a sign of adjustments made to the company's revenue recognition guidelines, accounting procedures, or operational effectiveness. In general, keeping an eye on the TATA ratio aids investors in evaluating the calibre and longevity of a business's profits as well as its dependence on accrual accounting techniques for financial reporting.

5.9 ANALYSIS OF FINANCIAL COMPONENTS OF TORRENT PHARMA LTD.

5.6 Table Showing, BENEISH MODEL Analysis of TORRENT PHARMA LTD

Torrent Pharmaceuticals Company					
FINANCIAL RATIO INDEX	2019	2020	2021	2022	2023
DSRI	0.83905531	1.0784418	1.01219618	1.1850395	0.9830909
GMI	1.02117492	0.9844285	0.99145403	0.9385202	1.0461576
AQI	1.02071122	0.9984686	1.05789915	0.9348801	1.0258474
SGI	1.289796	1.03968	1.008313	0.842223	1.141352
DEPI	0.80012029	0.9583343	0.97908699	0.9409934	0.9651962
SGAI	5.31940447	0.9664938	0.92091567	1.2831299	0.9907861
LVGI	1.34115623	0.973705	0.88917583	0.896916	1.0601522
TATA	0.26083569	0.3200826	0.41338639	0.4797313	0.4565985
M SCORE MODEL	3.22548716	2.1825752	1.64277952	1.4791839	2.4937793

(SOURCE: COMPUTED FROM EXCEL)

INTERPRETATION

By examining different financial statistics, the Beneish model is a method that can identify possible profits manipulation.

The duration it takes a business to recover its accounts receivable is measured by DSRI. The 2019 DSRI of 0.839 indicates that, on average, it takes the business 0.839 days to collect its accounts receivable. Over time, this ratio rises and peaks in 2022 at 1.185. It then slightly declines to 0.983 in 2023.A dropping DSRI can point to increased collection efficiency, whereas a rising DSRI might point to possible aggressive revenue recognition tactics. The relationship between a company's

revenue and gross profit is evaluated by GMI. The company's 2019 GMI of 1.021 indicates that its gross margin is somewhat higher than 1. GMI declines with time, suggesting a possible drop in gross margin as a percentage of revenue. The GMI decreases to 0.939 in 2022, the lowest point, and then rises to 1.046 in 2023.A declining GMI might be a sign of possible manipulation—for example, inflating sales or understating the cost of items sold. The AQI assesses the proportion of a company's total assets that are of a given quality. With an AQI of 1.021 in 2019, the company's assets appear to be of a quite high calibre. The AQI varies over time, peaking at 1.058 in 2021 and then marginally declining to 1.026 in 2023.A rising AQI could be a sign of possible manipulation, including overvaluing assets or neglecting to account for impairment charges. SGI calculates a company's sales growth rate. In 2019, SGI begins at 1.290, suggesting strong sales growth. SGI, on the other hand, decreases over time, peaking at 0.842 in 2022 and then rising to 1.141 in 2023.A falling SGI can give rise to questions about how long revenue growth can last and whether it can be manipulated to reach sales goals. DEPI evaluates the connection between a business's property, plant, and equipment (PPE) and depreciation. Over time, DEPI declines, suggesting that the rate of depreciation in relation to PPE may be declining. This might point to possible manipulation, like extending an asset's usable life to boost profits. SGAI assesses the correlation between a business's sales and its general and administrative expenses. The SGAI varies during the years, peaking at 0.921 in 2021, rising to 1.283 in 2022, and then falling to 0.991 in 2023.Variations in the SGAI may suggest that expenses are being manipulated in order to control profits. The link between a company's debt and equity is evaluated by LVGI. Over time, the LVGI varies; it peaked in 2021 at 0.889 and then increased to 1.060 in 2023.Variations in LVGI could be an indication of changes to the capital structure of the business and possible debt management manipulation. TATA calculates the percentage of an organization's profits attributable to accruals as opposed to cash flow.As time goes on, TATA rises, signifying a greater ratio of accrued earnings to total assets. This might point to possible wage inflation manipulation. The financial ratios listed above are used to construct the composite score known as the M-Score. An increased M-Score indicates a greater probability of earnings manipulation. The M-Score varies with time, suggesting different possible manipulation risk levels. It reaches its maximum in 2019 at 3.225, falls to 1.643 in 2021, and then rises to 2.494 in 2023 once again.

In conclusion, the data for Torrent Pharmaceuticals Company reveals variations over time in a number of financial parameters, suggesting possible areas to be concerned about the manipulation of earnings.

5.6.1 TABLE SHOWING DAYS' SALES IN A RECEIVABLE INDEX ANALYSIS OF TORRENT PHARMA LTD.

PHARMA LTD					
PARTICULAR	2019	2020	2021	2022	2023
ACCOUNT RECEIVBLE	1,356.01	1,508.94	1,544.26	1,541.35	1,729.44
SALES	7,673	7,939	8,005	6,742.32	7,695.20
NUMBER OF DAYS	365	366	365	365	365
DSRI	0.839055 31	1.0784417 59	1.012196 18	1.1850394 81	0.9830909 13

(SOURCE: COMPPUTED FROM EXCEL)

The Days Sales in Receivables Index (DSRI) measures the efficiency of a company in collecting payments from its customers. A DSRI below 1 indicates that the company is taking longer to collect payments relative to its sales. In 2019, Torrent Pharmaceuticals had a DSRI of 0.839, suggesting a relatively longer collection period compared to its sales volume.

5.6.2 TABLE SHOWING GROSS MARGIN INDEX ANALYSIS OF TORRENT PHARMA.

Torrent Pharmaceuticals Company					
PARTICULAR	2019	2020	2021	2022	2023
SALES	7,673	7,939	8,005	6,742.32	7,695.20
COGS	1,206	1,352	1,420	1537	1,480
SALES T1	5,949	7,673	7,939	8,005	6,742.32
COGS T1	1,039	1,206	1,352	1,420	1537
GMI	1.021175	0.984429	0.991454	0.93852	1.046158

(SOURCE: COMPUTED FROM EXCEL)

A company's gross margin is compared over time using the Gross Margin Index (GMI), which reflects variations in profitability. When compared to the prior year, Torrent Pharmaceuticals' GMI in 2019 was somewhat above 1, suggesting a rather strong gross margin. Nonetheless, the GMI continuously fell below 1 between 2020 and 2022, indicating a drop in profitability or an increase in the cost of goods sold in comparison to sales. In 2023, the GMI recovered to be over 1, indicating a rise in profitability, which could be the result of higher sales prices, cost-cutting initiatives, or improved operational efficiency. In general, GMI aids in evaluating shifts in a business's profitability and gross margin over time.

5.6.3 TABLE SHOWING ASSET QUALITY INDEX ANALYSIS OF TORRENT PHARMA.

Torrent Pharmaceuticals Company					
PARTICULAR	2019	2020	2021	2022	2023
Current Assets	5,037	5,008	5,521	5,164	5,313
PP&E	2,800	2,817	2,757	2,575	2,626
Total Long-term Investments	3	3	42	42	43
Total Assets	14,120	14,037	14,074	15,011	5,952
AQI	1.020711215	0.998468634	1.057899154	0.934880125	1.025847406

(SOURCE: COMPUTED FROM EXCEL)

The AQI did, however, go below 1 in 2020, indicating a possible decline in asset quality relative to liabilities. This decline might be the result of things like higher debt or declining asset values, which could lead to an increase in liabilities or a decline in asset quality. The AQI rises to 1.058 in 2021, indicating an improvement in asset quality in comparison to liabilities. This improvement may result from a number of things, including lower liabilities or higher asset prices.

5.6.4 TABLE SHOWING SALES GROWTH INDEX ANALYSIS OF TORRENT PHARMA.

PARTICULAR	2019	2020	2021	2022	2023
SALES	7,673	7,939	8,005	6,742.00	7,695.00
T1	5,949	7,673	7,939	8,005	6,742
SGI	1.289796	1.03968	1.008313	0.842223	1.141352

(SOURCE: COMPUTED FROM EXCEL)

The rate at which a company's sales fluctuate over time is represented by the Sales Growth Index (SGI). Torrent Pharmaceuticals saw strong sales growth in 2019, as seen by an SGI of 1.29, which is a notable rise over the prior year. Nonetheless, the SGI values for 2020 and 2021 show a minor deceleration in sales growth, pointing to a slowing in revenue expansion. The SGI significantly declines to 0.842 in 2022, indicating a sharp decline in sales over the previous year, potentially as a result of a number of variables like internal difficulties or market conditions. Nonetheless, 2023 sees a recovery with an SGI of 1.141, suggesting a return to positive sales growth that may be brought about by recovery initiatives or better market circumstances.

5.6.5 TABLE SHOWING DEPRECIATION INDEX ANALYSIS OF TORRENT PHARMA.

Torrent Pharmaceuticals Company					
PARTICULAR	2019	2020	2021	2022	2023
DEPRICIATION	617	654	657	662	706
PP&E	2,800	2,817	2,757	2,575	2,626
DEPRICIATION1	408	617	654	657	662
PP&E1	2,416	2,800	2,817	2,757	2,575
DEPI	0.80012	0.958334	0.979087	0.940993	0.965196

(SOURCE: COMPUTED FROM EXCEL)

The Depreciation Index (DEPI) measures the proportion of a company's property, plant, and equipment (PP&E) that is being depreciated relative to the total PP&E. In 2019, Torrent Pharmaceuticals had a DEPI of 0.800, indicating that depreciation expense was lower than the value of PP&E, suggesting a conservative depreciation policy or underutilization of assets. However, from 2020 to 2022, the DEPI

gradually increased, indicating a closer alignment between depreciation expense and PP&E values. The DEPI decrease in 2023 to 0.965 suggests a slight decrease in depreciation relative to PP&E, potentially indicating a change in depreciation methods or lower asset values. Overall, monitoring DEPI helps assess the efficiency of asset utilization and the adequacy of depreciation charges over time.

5.6.6 TABLE SHOWING SGAI INDEX ANALYSIS OF TORRENT PHARMA.

Torrent Pharmaceuticals Company					
PARTICULAR	**2019**	**2020**	**2021**	**2022**	**2023**
Selling, General and Admin expenses (SG&A	3,108	3,108	2,886	3,119	3,527
SALES	7,673	7,939	8,005	6,742.32	7,695.20
SGAI	5.319404	0.966494	0.920916	1.28313	0.990786

(SOURCE: COMPUTED FROM EXCEL)

The Selling, General, and Administrative Expenses Index (SGAI) evaluates the relationship between a company's sales and its SG&A expenses over a given time frame. Torrent Pharmaceuticals' high SGAI of 5.32 in 2019 suggested that SG&A costs were much greater than sales, which can have an effect on profitability. Nevertheless, SGAI fell below 1 in 2020 and 2021, pointing to a more advantageous ratio where SG&A costs were lower than revenues, possibly increasing profitability.

The 2022 SGAI of 1.28 indicates a rise in SG&A expenses in relation to sales, which could have a negative effect on profitability. But in 2023, SGAI dropped to 0.991 once more, suggesting that the SG&A spending ratio in relation to sales had returned to being more advantageous. Overall, SGAI offers information on the company's operational effectiveness and financial health as well as how well SG&A expenses.

5.6.7 TABLE SHOWING LEVERAGE INDEX ANALYSIS OF TORRENT PHARMA.

Torrent Pharmaceuticals Company					
PARTICULAR	2019	2020	2021	2022	2023
Current Liabilities	5,165	5,482	4,891	4,415	5,447
Total Long-term Debt	3,912	3,303	2,941	2,123	2,496
Total Assets	14,120	14,037	14,074	13,099	15,011
LVGI	0.277054	0.235307	0.208967	0.162073	0.166278

(SOURCE: COMPUTED FROM EXCEL)

The percentage of a company's assets financed by long-term debt is evaluated by the Leverage Index (LVGI). Torrent Pharmaceuticals' LVGI in 2019 was 0.277, meaning that long-term debt accounted for about 27.7% of the company's assets. A decline in the LVGI over time indicates a decreased reliance on long-term debt for funding. A more cautious financial approach or increased financial stability may be indicated by Torrent Pharmaceuticals' decreasing trend in LVGI from 2019 to 2023, which implies that the company has been relying less on long-term debt to finance its assets.

5.6.8 TABLE SHOWING TOTAL ACCRUALS TO TOTAL ASSETS ANALYSIS OF TORRENT PHARMA.

Torrent Pharmaceuticals Company					
PARTICULAR	2019	2020	2021	2022	2023
Income from Continuing Operations	5,762	6,168	8,004	8,508	9,620
Cash Flow from Operations	2,079	1,675	2,186	2,224	2,766
TOTAL ASSET	14,120	14,037	14,074	13,099	15,011
TATA	0.260836	0.320083	0.413386	0.479731	0.456598

(SOURCE: COMPUTED FROM EXCEL)

The ratio known as Total Accruals to Total Assets, or TATA, quantifies the degree to which accrual accounting as opposed to cash transactions drives a company's earnings. With a TATA ratio of 0.261 in 2019, Torrent Pharmaceuticals was able to demonstrate that a significant amount of its revenue was generated by non-cash accruals as opposed to cash transactions. This implies that profits that are mostly derived from non-cash transactions could not be as steady or long-lasting. The TATA ratio increased from 2019 to 2023, indicating that accruals accounted for a larger share of earnings than total assets. Changes in revenue recognition guidelines, modifications to inventory or accounts payable, or other non-cash accounting entries could all be to blame for this increase. TATA ratio trends should be closely watched, though, as a persistently high ratio may point to aggressive accounting techniques or possible earnings manipulation, while a declining trend may point to better cash flow management and higher-quality earnings.

5.10 ANALYSIS OF FINANCIAL COMPONENTS OF ZYDUS PHARMA LTD.

5.7 Table Showing, BENEISH MODEL Analysis of ZYDUS PHARMA LTD.

ZYDUS PHARMA LTD					
FINANCIAL RATIO INDEX	2019	2020	2021	2022	2023
DSRI	8.9313532	0.5785449	0.17656759	1.1877102	1.3812718
GMI	-1.2566251	0.0345027	-14.624363	0.9677922	1.0903348
AQI	1.13184746	1.0414294	1.00694553	1.2517053	0.8794795
SGI	0.737577	2.015991	4.376933	1.007313	1.114165
DEPI	1.17831416	0.9263632	3.95842382	0.3730419	0.9710715
SGAI	0.62595955	2.1762425	1.10572622	2.700268	1.1473563
LVGI	1.23996586	0.9401871	0.52839604	1.2578208	0.9999975
TATA	0.82042411	0.6915144	0.62090817	0.6950846	0.6787041
M SCORE MODEL	8.83774922	1.3693196	-5.9717003	2.9366124	2.270224

(SOURCE: COMPUTED FROM EXCEL)

INTERPRETATION

The Beneish model hypothesis can be used to analyse Zydus Lifesciences Company's financial data for the years 2019 to 2023 in order to gain insight into the company's financial performance and potential for earnings manipulation.

The duration it takes a business to recover its accounts receivable is measured by DSRI. The DSRI for 2019 is a very high 8.931, suggesting that the company's accounts receivable collection process is unusually drawn out. This might point to possible problems with aggressive revenue recognition techniques or credit management.2020 sees a sharp decline in DSRI to 0.579, indicating a dramatic increase in the effectiveness of receivables collection. It does, however, drop even lower in 2021 to 0.177, suggesting that there may have been an aberration or manipulation. DSRI rises once more in 2022 to 1.188 and once more in 2023 to 1.381, which may indicate a return to more customary collection procedures or adjustments to the conditions of sales.

The relationship between a company's revenue and gross profit is evaluated by GMI.With a notable negative GMI of -1.257 in 2019, the company's gross margin is below expectations when compared to its revenue. This can point to serious financial problems or possible manipulation.2020 sees an improvement in GMI to 0.035, indicating a correction or rebound in the gross margin. But in 2021, it drops sharply to -14.624, indicating a serious distortion in the gross margin that might be brought on by unusual circumstances or manipulation. The gross margin may normalise if the GMI rises to 0.968 in 2022 and then to 1.090 in 2023.

The AQI assesses the proportion of a company's total assets that are of a given quality. With some minor variations, the AQI's performance has been comparatively steady over time. It rises marginally to 1.007 in 2021 and falls to 0.879 in 2023, possibly indicating little shifts in the quality of the assets.

SGI calculates a company's sales growth rate. Significant variations can be seen in SGI throughout time. Its 2019 starting value of 0.738 denotes a rather modest pace of sales growth. Then, in 2020, SGI rises significantly to 2.016, indicating a huge surge in sales. SGI does, however, see a sharp increase to 4.377 in 2021, suggesting an atypical or artificially high rate of sales growth. SGI declines to 1.007 in 2022

and then again to 1.114 in 2023, which may indicate a return to more typical rates of sales growth.

DEPI evaluates the connection between a business's property, plant, and equipment (PPE) and depreciation. Significant annual variations in DEPI point to possible anomalies in the company's asset management or depreciation procedures.

The link between a business's sales income and its general and administrative (SGAI) costs is measured. With an SGAI of 0.626 in 2019, the business's SG&A costs are modest when measured against sales revenue. But in 2020, the ratio rises dramatically to 2.176, indicating a considerable rise in SG&A costs in comparison to sales revenue. Even though the ratio varies from year to year, it consistently stays above 1, suggesting that SG&A costs continue to account for a sizeable share of sales revenue.

The link between a company's debt and equity is assessed by LVGI. With a reasonable level of leverage and a comparatively balanced capital structure, the 2019 LVGI is 1.240. But in 2020, this ratio drops precipitously to 0.940, indicating either a decrease in leverage or a rise in equity in comparison to debt. In 2021, the LVGI drops even lower to 0.528, suggesting even more leverage reduction. But in 2022, it rises once more to 1.258 before levelling out at 1 in 2023.

The link between a company's debt and equity is assessed by LVGI. With a reasonable level of leverage and a comparatively balanced capital structure, the 2019 LVGI is 1.240. But in 2020, this ratio drops precipitously to 0.940, indicating either a decrease in leverage or a rise in equity in comparison to debt.

In 2021, the LVGI drops even lower to 0.528, suggesting even more leverage reduction. But in 2022, it rises once more to 1.258 before levelling out at 1 in 2023.

TATA calculates the percentage of an organization's profits attributable to accruals as opposed to cash flow. With a TATA of 0.820 in 2019, accruals account for about 82% of the company's earnings. TATA declines with time, hitting its lowest value of 0.621 in 2021 and then rising marginally to 0.679 in 2023.A declining TATA implies a smaller percentage of accruals, which may be a sign of higher-quality earnings and less manipulation risk.

The M-Score is a composite score used to evaluate the possibility of earnings manipulation. It is derived from a number of financial statistics, including TATA. With an M-Score of 8.838 in 2019, it is quite likely that earnings will be manipulated. But by 2020, it drops significantly to 1.369, indicating a significant

reduction in the likelihood of manipulation. The M-Score drops to -5.972 in 2021, suggesting that trends in earnings manipulation may be reversing. After that, the M-Score rises once more to 2.937 in 2022 and then somewhat declines to 2.270 in 2023.The M-Score fluctuates throughout time, indicating different levels of risk of earnings manipulation. A notable improvement was shown in 2020, and there were oscillations in the years that followed.

5.7.1 TABLE SHOWING DAYS' SALES IN A RECEIVABLE INDEX ANALYSIS OF ZYDUS.

Zydus Lifesciences Company					
PARTICULAR	2019	2020	2021	2022	2023
ACCOUNT RECEIVBLE	21,121	24,567	19,038	22,777	35,053
SALES	8,817	17,775	77,800	78,369	87,316
NUMBER OF DAYS	365	366	365	365	365
DSRI	8.931353197	0.578544943	0.176567 59	1.187710214	1.381271796

(SOURCE: COMPUTED FROM EXCEL)

The Days Sales in Receivables Index, or DSRI, evaluates how well a business gets paid by its clients. Zydus Lifesciences had a very high DSRI of 8.93 in 2019, which is indicative of an abnormally long payment collection delay in relation to sales. An abnormally high value like this could point to slow credit management or untimely collections. But in 2020 and 2021, the DSRI sharply declined to 0.58 and 0.18, respectively, suggesting a marked improvement in the business's capacity to recover payments on time, maybe as a result of tighter credit conditions with clients or improved credit management procedures. The DSRI grew to levels above 1 in 2022 and 2023, indicating effective accounts receivable management by Zydus Lifesciences, which is now collecting payments faster than generating sales. The company's overall performance in managing its working capital and recovering receivables over time is reflected in the variations in DSRI.

5.7.2 TABLE SHOWING GROSS MARGIN INDEX ANALYSIS OF ZYDUS.

PARTICULAR	2019	2020	2021	2022	2023
SALES	8,817	17,775	77,800	78,369	87,316
COGS	17,558	18,383	38,882	40,429	41,226
SALES 1	1,19,544	8,817	17,775	77,800	78,369
COGS 1	25,233	17,558	18,383	38,882	40,429

A company's gross margin fluctuation over time is evaluated using the Gross Margin Index (GMI). Zydus Lifesciences' gross margin was much lower in 2019 than it was in 2018, as evidenced by its negative GMI of -1.257. Price pressures or excessive costs compared to sales could be the cause of this. 2020 saw an increase in the GMI, indicating a modest but positive return in the gross margin. But in 2021, the GMI drops significantly to -14.624, indicating a big reduction in gross margin possibly as a result of a sharp rise in the cost of products sold in relation to sales. The gross margin has improved in the ensuing years, and the GMIs above indicate a rise in profitability over the prior year. This improvement could result from a number of things, including pricing revisions, efficiency gains, or cost-cutting initiatives.

5.7.3 TABLE SHOWING ASSET QUALITY INDEX ANALYSIS OF ZYDUS.

PARTICULAR	2019	2020	2021	2022	2023
Current Assets	84,981	87,154	87160	1,20,952	1,00,082
PP&E	51,059	54,522	55,500	57,616	56,965
Total Long-term Investments	2299	2128	1989	5605	5107
Total Assets	2,34,831	2,36,866	2,38,847	2,77,954	2,57,564
AQI	1.131847459	1.041429362	1.006945533	1.251705256	0.879479522

(SOURCE: COMPUTED FROM EXCEL)

The percentage of a company's assets that are liquid or readily convertible into cash is measured by the Asset Quality Index (AQI). With an AQI of 1.132 in 2019, Zydus Lifesciences demonstrated a reasonably sound ratio of total assets to current assets, implying strong liquidity and the capacity to fulfil short-term commitments. The AQI somewhat declined in 2020 and 2021 but stayed over 1, demonstrating the company's

continued excellent liquidity position. The AQI, however, significantly rises to 1.252 in 2022, suggesting a larger percentage of current assets compared to total assets. This rise points to either increased liquidity or a tactical move to keep more liquid assets. On the other hand, the AQI noticeably drops to 0.879 in 2023, suggesting a smaller percentage of current assets compared to total assets. This decline can point to a drop in liquidity or an alteration in the asset mix. In general, AQI aids in evaluating Zydus Lifesciences's asset quality and liquidity over time.

5.7.4 TABLE SHOWING SALES GROWTH INDEX ANALYSIS OF ZYDUS.

PARTICULAR	2019	2020	2021	2022	2023
SALES	8,817	17,775	77,800	78,369	87,316
T1	11,954	8,817	17,775	77,800	78,369
SGI	0.737577	2.015991	4.376933	1.007313	1.114165

(SOURCE: COMPUTED FROM EXCEL)

The rate at which a company's sales fluctuate over time is gauged by the Sales Growth Index (SGI). Zydus Lifesciences had a lower sales volume in 2019 than it had in 2018, as indicated by its SGI of 0.738. Numerous variables, including internal difficulties or market conditions, could have contributed to this drop. But in 2020, SGI rises to 2.016, indicating a notable increase in sales over the prior year, pointing to either a strong performance or perhaps a unique event like the introduction of a new product. The SGI rises to 4.377 in 2021, a sign of ongoing strong sales growth.

5.7.5 TABLE SHOWING DEPRECIATION INDEX ANALYSIS OF ZYDUS.

PARTICULAR	2019	2020	2021	2022	2023
DEPRICIATION	5,986	6,965	1,635	4,787	4,886
PP&E	51,059	54,522	55,500	57,616	56,965
DEPRICIATION1	5,388	5,986	6,965	1,635	4,787
PP&E1	38,188	51,059	54,522	55,500	57,616
DEPI	1.178314	0.926363	3.958424	0.373042	0.971072

(SOURCE: COMPUTED FROM EXCEL)

The Depreciation Index (DEPI) evaluates the effectiveness of asset utilisation and depreciation procedures by contrasting a company's depreciation expense with the property, plant, and equipment (PP&E) value. With a DEPI of 1.178 in 2019, Zydus Lifesciences' depreciation expense was marginally greater than their PP&E, which could indicate aggressive depreciation or a potential overestimation of asset usage. But in 2020, the DEPI fell to 0.926, meaning that the amount of depreciation expense was less than the total value of PP&E. This could mean that assets were underutilised or that depreciation was handled conservatively. A change in accounting policies or asset write-offs may be the cause of the notable increase in the DEPI to 3.958 in 2021, which indicates a considerable increase in depreciation relative to PP&E value. In 2022, the DEPI drops to 0.373, showing a significant fall in depreciation in comparison to PP&E. This could potentially signify a reduction in depreciation costs or a rise in asset values. In general, DEPI aids in evaluating the effectiveness and suitability of asset utilisation and depreciation procedures over time.

5.7.6 TABLE SHOWING SGAI INDEX ANALYSIS OF ZYDUS.

PARTICULAR	2019	2020	2021	2022	2023
Selling, General and Admin expenses (SG&A	8,928	13,837	32,930	21,045	26,888
SALES	8,817	17,775	77,800	78,369	87,316
SGAI	3.92901	0.76877	0.543726	0.634442	1.146727

(SOURCE: COMPUTED FROM EXCEL)

The Selling, General, and Administrative Expenses Index (SGAI) evaluates cost control and operational effectiveness by comparing a company's SG&A expenses to sales. Zydus Lifesciences had a high SGAI of 3.929 in 2019, meaning that SG&A costs were high in relation to sales and could have an effect on profitability. There could be a number of reasons for this, including excessive marketing costs, overhead in the office, or ineffective cost control. With SG&A spending less than sales in 2020, SGAI dropped dramatically to 0.769, indicating a more favourable ratio that might point to better cost control or more effective sales. The SGAI does, however, slightly increase to 0.544 in 2021, showing a minor increase in SG&A expenses relative to sales. This increase may be the result of more marketing or administrative costs to support business growth. The SGAI rises marginally to

0.634 in 2022, indicating a potential increase in SG&A costs relative to revenues as a result of operational expansions or expenditures in marketing and sales initiatives. The SGAI increases significantly to 1.147 in 2023, an indication of a large increase in SG&A expenditures in relation to sales. This could indicate increased marketing or administrative costs that have an influence on profitability.

5.7.7 TABLE SHOWING LEVERAGE INDEX ANALYSIS OF ZYDUS.

PARTICULAR	2019	2020	2021	2022	2023
Current Liabilities	73,425	82,694	48,210	40,279	27,901
Total Long-term Debt	7,528	9,453	6,105	25,362	10,515
Total Assets	1,36,711	1,65,515	1,84,636	1,77,400	2,05,636
LVGI	1.239966	0.940187	0.528396	1.257821	0.999998

(SOURCE: COMPUTED FROM EXCEL)

The percentage of a company's assets that are financed by long-term debt is assessed by the Leverage Index (LVGI). With an LVGI of 1.240 in 2019, Zydus Lifesciences' assets were financed by long-term debt to the tune of almost 124%. This may indicate a greater reliance on debt financing in comparison to overall assets, which could increase financial risk. The LVGI fell to 0.940 in 2020, a sign that the percentage of assets financed by long-term debt was declining. This decline can indicate a drop in debt or an increase in the value of assets. The LVGI does, however, noticeably decline to 0.528 in 2021, showing a substantial decline in the percentage of assets supported by long-term debt. Refinancing, asset sales, or debt repayments could be the cause of this decline. The LVGI rises to 1.258 in 2022, suggesting a greater reliance on long-term debt to fund assets. This increase could be the consequence of borrowing for business growth or investment.

5.7.8 TABLE SHOWING TOTAL ACCRUALS TO TOTAL ASSETS ANALYSIS OF ZYDUS.

Zydus Lifesciences Company					
PARTICULAR	**2019**	**2020**	**2021**	**2022**	**2023**
Income from Continuing Operations	1,31,656	1,42,531	1,51,022	1,51,099	1,72,374
Cash Flow from Operations	19,495	28,075	36,380	27,791	32,808
TOTAL ASSET	1,36,711	1,65,515	1,84,636	1,77,400	2,05,636
TATA	0.820424	0.691514	0.620908	0.695085	0.678704

By comparing a company's accruals to its total assets, the Total Accruals to Total Assets (TATA) ratio can be used to determine how much of its earnings come from non-cash things as opposed to cash transactions. Zydus Lifesciences's TATA ratio for 2019 was 0.820, meaning that accruals as opposed to cash transactions accounted for almost 82.0% of the company's earnings. This shows that a sizable portion of reported earnings may be derived from non-cash factors like accounts payable, receivable, and inventory changes. In contrast to 2019, the 2020 TATA ratio of 0.692 indicates a lower dependence on accruals for profits growth. This could result from adjustments made to accounting rules or from better cash flow management. The TATA ratio drops even further in 2021, to 0.621, demonstrating a persistent decrease in the share of accruals-driven earnings over total assets. This decline could be a sign of shifting towards a greater reliance on cash transactions or more conservative accounting methods. But in 2022, the TATA ratio rises little to 0.695, indicating a minor increase in the percentage of earnings that are generated by accruals. Changes in revenue recognition or a higher proportion of non-cash transactions to total assets could be the cause of this growth. Compared to the prior year, the TATA ratio in 2023 stays comparatively steady at 0.679, suggesting a steady degree of reliance on accruals for the creation of earnings.

ANNUAL REPORTS

- Annual reports of Sun Pharmaceutical Ltd. From 2018-19 to 2022-23
- Annual reports of Cipla Ltd. From 2018-19 to 2022-23
- Annual reports Dr.Reddy's Labs From 2018-19 to 2022-23
- Annual reports of Torrent Pharma From 2018-19 to 2022-23
- Annual reports of Zydus Life From 2018-19 to 2022-2

CHAPTER 6

SUMMARY, FINDINGS AND SUGGESTIONS

INDEX

6.1 INTRODUCTION

The set of facts is referred to as the "findings". In conclusion, the writer summarises their assessment of the available evidence. Recommendations or suggestions are future courses of action that the author believes are warranted in light of the findings and conclusions. The dissertation's findings, conclusions, and suggestions are presented in this part. The outcomes of the data analysis are the conclusions. Conclusions are responses to the issues raised or declarations that support or refute the theories put forward. The result of the five chapters that came before it is this one. It has to do with the study's conclusions, which is why the researcher started her investigation.

6.2 SUMMARY OF THE STUDY

These chapters, which together comprise the whole Research Dissertation, are as follows:

1. **INTRODUCTION OF THE PHARMACEUTICAL INDUSTRY**

   This chapter covers an overview of the pharmaceutical industry, including what the term "pharmaceuticals industry" means, a brief history of medicine's beginnings, the post-independence era of the pharma sector, the pharmaceutical firms' demands and types, market size, GDP contribution, regulatory bodies, government activities, current advances, the influence of the coronavirus, important issues, global pharmaceutical company business, a SWOT analysis, and the five S's of the pharmaceutical sector. The healthcare sector includes the pharmaceutical industry, which deals with medications. This demonstrates the importance of the Indian pharmaceutical sector to the country's economy.

2. **CONCEPTUAL FRAMEWORK OF BENEISH MODEL & SAMPLE PROFILE OF COMPANY**

   One or more formal theories (in whole or in part), along with additional concepts and empirical data from the literature, make up a conceptual framework. A comprehensive explanation of the Beneish model, which are the centre of the current investigation and is employed by academics to ascertain the financial deception of particular pharmaceutical corporations. Furthermore, all of the chosen sample companies' fundamental information is included in this chapter. In summary, this chapter provides a visual picture of the researcher's work.

3. LITERATURE REVIEW

An outline of earlier studies on the subject of the inquiry is given in a descriptive literature review. Establishing a foundation for the study, preventing duplication, detecting gaps, and constructing a theoretical framework are all made possible by this examination of the literature. structure and approach. The nature of its products, the market's volatility, the industry's strict rules, and its massive investments which typically require more research and development make the pharmaceutical sector unusual. Therefore, in the current study, the financial fraud of significant pharmaceutical corporations in India was examined using the Beneish model.

4. RESEARCH METHODOLOGY

This chapter discusses the methodology used for the study. The research methodology is covered in this chapter along with subjects including what research is, why it matters, what makes a good research project, and how it works. The research design, which covers the study's title, objectives, hypothesis, sample design, tools, and procedures to be employed, is another important topic mentioned in this chapter. Included are the study's limitations, importance, and future scope. The researcher should give the reader an explanation of her study task planning and the rationale behind her research design selection in the methodology chapter.

5. DATA ANALYSIS AND DATA INTERPRETATION

This chapter validates the study's title, which makes it a crucial chapter in the research process. In this chapter, the researcher assesses the financial fraud of particular pharmaceutical corporations using the Beneish model.

6. SUMMARY, FINDINGS, AND SUGGESTIONS

The main focus of the five chapters above is this one. It has to do with the study's conclusions, which is why the investigator began her investigation. She might also recommend more research to address any unanswered questions from her findings. issue. In addition, scholars may provide concepts for additional research that tackle the limitations of your investigation.

6.3 FINDINGS OF THE STUDY

The applicability and efficacy of the Beneish Model in identifying financial statement fraud inside listed pharmaceutical businesses in India are most likely the subjects of the study "Financial Statement Fraud Detection with the Beneish Model: An Empirical Study of Listed Pharmaceutical Companies in India". Based on numerous financial ratios and indications, the Beneish Model, created by Professor Messod D. Beneish, is a statistical model used to detect financial fraud or manipulation.

- **Effectiveness of the Beneish Model**

  The study may assess the efficacy of the Beneish Model in identifying financial statement fraud in the context of Indian pharmaceutical companies that are listed. It might evaluate how well the model can differentiate between businesses that are acting responsibly financially and those that might be involved in fraud.

- **Identified Fraudulent Companies**

  Based on the Beneish Model's analysis, the study might pinpoint particular pharmaceutical corporations that show indicators of financial statement fraud. These businesses could be used as case studies to comprehend the type and scope of fraud in the sector.

- **Key Indicators of Fraud**

  The study may focus on financial ratios or indications that are important in identifying fraudulent activity in pharmaceutical companies. Metrics including accruals quality, manipulation of results, and shifts in financial leverage may be included in this.

- **Comparison with Previous Studies**

  The study's conclusions may be compared to earlier investigations on the identification of financial statement fraud in different sectors or geographical areas. This comparison may highlight any patterns unique to the pharmaceutical industry in India or difficulties in identifying fraudulent activity within the sector.

- **Implications for Regulation and Oversight**

  The study's conclusions may be discussed in relation to regulatory agencies and oversight procedures that control financial reporting and disclosure policies in the pharmaceutical sector. Based on the research findings, suggestions for

strengthening fraud detection methods or strengthening regulatory frameworks might be made.

- **Limitations and Future Research Directions**

  Lastly, the study may point out any shortcomings in the data analysis or research methodology used, as well as recommend directions for future investigations to strengthen and confirm the Beneish Model's efficacy in identifying financial statement fraud in the pharmaceutical industry and other sectors.

6.4 SUGGESTION OF THE STUDY

The study "Financial Statement Fraud Detection with the Beneish Model: An Empirical Study of Listed Pharmaceutical Companies in India" produced recommendations that most likely focused on strengthening regulatory procedures and fraud detection systems in the pharmaceutical sector.

- **Enhanced Monitoring and Surveillance**

  The study would suggest that Indian governing bodies and regulatory agencies step up their oversight and supervision of listed pharmaceutical companies' financial reporting methods. This would entail putting in place stricter monitoring procedures and using cutting-edge analytics tools, such the Beneish Model, to identify possible financial statement fraud early on.

- **Industry-Specific Guidelines**

  Owing to the distinct attributes and intricacies of the pharmaceutical domain, the research may propose the creation of industry-specific protocols or criteria for financial reporting and disclosure. These recommendations might deal with typical instances of financial fraud noted in the research and offer precise standards for evaluating the accuracy of financial reports in the pharmaceutical sector.

- **Educational Initiatives**

  The report may suggest educational activities and training programmes to improve stakeholders' knowledge and comprehension of financial statement fraud threats within the pharmaceutical business. These courses could be aimed at executives, auditors, investors, and other pertinent stakeholders, giving them the skills and information needed to spot and stop fraud.

- **Collaborative Efforts**

  In order to effectively combat financial statement fraud, the study may recommend that regulatory bodies, trade associations, academic institutions, and other stakeholders work together more closely. Through exchanging knowledge, strategies, and assets, these cooperative endeavours may fortify the pharmaceutical industry's overall ability to withstand fraudulent activities.

- **Technological Solutions**

  In light of the growing complexity of financial fraud schemes, the study might support the addition of cutting-edge technical solutions to classic fraud detection techniques, like artificial intelligence and machine learning algorithms. The efficacy and precision of pharmaceutical businesses' fraud detection procedures may be improved by these technologies.

- **Periodic Reviews and Updates**

  Finally, the study may suggest that regulatory frameworks and fraud detection algorithms be reviewed and updated on a regular basis in order to adjust to changing market conditions and new fraud risks. Because financial statement fraud in the pharmaceutical business is dynamic, an iterative method would guarantee that fraud detection procedures stay strong and efficient.

6.5 CONCLUSION

The integrity of capital markets as a whole, investors, and regulators are all at serious danger from financial statement fraud. Sustaining faith and confidence in financial reporting systems depends on the identification and prevention of such fraudulent activity. Professor Messod D. Beneish's Beneish Model has become a useful instrument for spotting possible financial statement fraud. The research has yielded numerous significant findings that provide insight into the frequency of financial statement fraud and the suitability of the Beneish Model for the Indian pharmaceutical industry. Significant ramifications flow from these findings for investors, auditors, regulatory agencies, and other parties with an interest in financial reporting and supervision. The study's key findings are outlined in this conclusion, along with their implications and suggestions for further research and application. The Indian pharmaceutical industry's financial statement fraud was found to be significantly predicted by a few financial measures and indicators. These signs consist of anomalous accruals, variations in financial leverage, and departures from the standard within the industry. Setting priorities for the detection and investigation of possible financial statement fraud incidents can be facilitated by the identification of these important indications.

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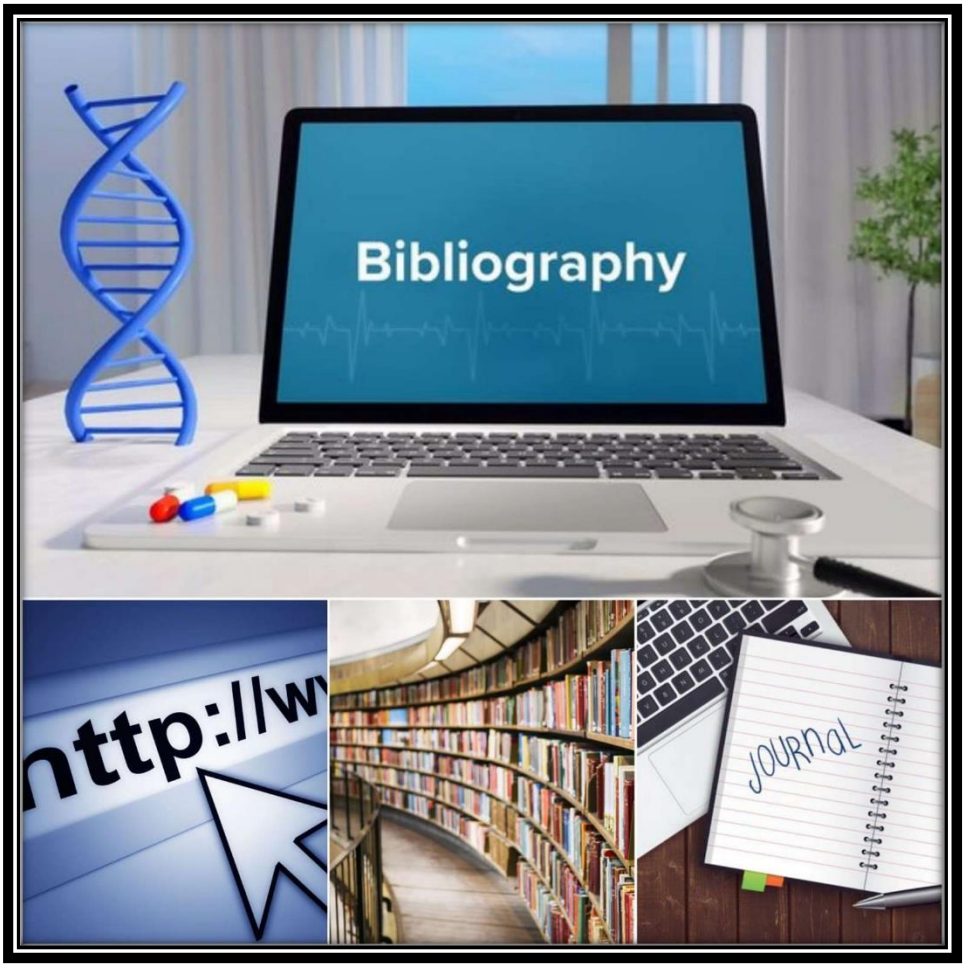

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