Impact of Macro-environmental factors on the Pharmaceutical Industries

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Abstract—Macro-environment elements such as Political, Economic, Social, Technological, Legal, Environmental factors have an indirect influence on the organization which sets the comprehensive framework of conditions and mutual influences factor showed the more impact and the social factor showed less impact on the performance of the pharmaceutical industries determining all the aspects of the behaviour of the market actors. The focus of the study is to study the impact of the macro environmental factors on the performance of the pharmaceutical industries in India. A simple random sampling technique with 30 respondents as the sample size is fixed for the data collection and analysis. The study has been conducted with the use of both descriptive and inferential statistics. Measures of the central tendency and the histogram are used as descriptive statistics and the Chi-square test of association is the inferential statistics. Chi-square test of association authenticated there is a significant association between the performance of the pharmaceutical industries with factors (Political, Economic, Technological, Legal) and there is no significant association between the performance of the pharmaceutical industries and the remaining factors (social, environmental). Further, from the Descriptive statistics, we conclude that the political factor has more influence whereas the social factor has less influence.

Keywords—pharma Macro-environmental factors, pharmaceutical industries, statistical method, marketing

I. INTRODUCTION

Marketing is the process of planning and carrying out the creation, promotion, and distribution of ideas, goods, and services that satisfy the ideas and wants of individuals and organizations [1]. Marketing activity originates from the travelling merchants who had sold food and goods at town markets in the early 1500s from Europe. By the mid-1800s, companies produced mass items and transported them all over the distances. But in the 1900s, the advertising revolution has created new ways to broadcast the message and reached a potential customer. After that in the 2000s the digital revolution radically as well as tremendously transformed marketing. Hence, the practice of marketing has been known for millennia, but popularity gained in the late 19th century [2] [3].

Pharmaceutical marketing is a special type of marketing that encompasses management process of execution by different individuals or organizations to actualize market product, to identify and profitably meet patients' needs with a prime aim of service [4] [5] , research concepts identified by way of lead compounds as practical therapeutical goods into the market [6]. Pharmaceutical industries adopted marketing with controlled practices by applying regulatory services and it is a sizeable business to

grow at a rapid rate. The disbursement of marketing expenses in the pharmaceutical sector has increased by nearly 70% in the past 20 years for better marketing of the lead compound in the universe than [7] [8] that leading drug companies disburse on research and development [9] . For instance, Johnson and Johnson disburse more than twice on marketing than research and development [10]Further, many regulations such as the Drugs and cosmetics act and rules (1940 & 1945), Drugs and Magic remedies (1954) [11], complex payment series, and the involvement of multiple decision-makers, pharmaceutical marketers never fail to amaze with innovations in marketing[12].

For better customer satisfaction, capturing the new market, positioning a product in the market and in customers' minds to increase sales, marketing innovation is the new method of marketing technology [13]. Successful marketing is to retain customers for future sales which determines its future marketing strategy [12]. Many companies focus on marketing strategies, with controlling of many factors that affect the marketing by the term named as environmental factors that are of two types external environment and internal environment [14]. The internal environment includes situational factors within the organization whereas the external environment includes the

outside forces of the organizational margins of business [14] which is again divided into two factors micro [direct] environment and macro [In direct] environment [14]. The micro-environment encompasses, suppliers, customers competitors, government regulatory agencies, the labour union that directly affect the organization's operation and performance, whereas the macro-environment elements, Political, Economic, Social, Technological, Legal, Environmental factors have an indirect influence on the organization by way of a comprehensive framework of conditions and mutual influences on all the aspects of the behaviour of market actors [15]. Hence, it is important to determine the influence of the macro-environment on the pharmaceutical industries. The aim of this study is to examine the impact of the macroenvironment on the pharmaceutical industries and to determine which factors among the macroenvironment play a prime most contribution in the performance of the pharmaceutical industries.

II. RELATED WORK

The macro-environment has been the focus of research and various studies already have been studied. Mohammad Nayeem Abdullah and Rebeka Shamsher [2011] have evaluated pharmaceutical companies in Bangladesh and studied the impact of PEST analysis on the pharmaceutical sector. It was found that steadily improving economic performance, combined with a general determination of the quality of health care, leads to steady market growth. Further, Government policies and economic conditions and the countries' demographics are all in favour of the growth of the pharmaceutical sector. In addition, Government support is very important for the growth and expansion of the sector. Hannah Chika et al [2020] examined the impact of the external environment on the structure of organizations. It was observed that the external environment has a great impact on the organization and implied that changes in the business environment are a key factor that would actually alter or influence the structure of an organization positively or negatively. So, it is widely recognized that environmental factors have a severe impact on several industries.

III. METHODOLOGY

Research methods
The quantitative research approach and cross-sectional study design were used for this research study. According to [16], to test pre-specified concepts, constructs, and hypotheses, quantitative research is a primarily deductive process that includes surveys, organized interviews, measurement observations, and reviews of records or documents for numeric or quantifiable information. Further, cross-sectional study design [17] in which from either the entire population or a subset and data are collected to help answer each question of interest. It is called cross-sectional because the information about X and Y is gathered to represent what is going on at only one point in time. For this study, both primary and secondary data were used. The primary data were collected using structured, self-designed, and pre-tested questionnaires, and secondary data were obtained from sources like newspapers, periodicals, websites, and publications of industry analysts.

Sample size and sampling techniques
The sample is a subset of a population and the process of selecting a sample is known as sampling. There are a lot of sampling techniques that are grouped into two categories as probability and non-probability sampling [18] [19]. Of all the sampling techniques, we chose simple random sampling which states that every case of the population has an equal probability of inclusion in the sample. The number of participants or specimens required in a study is a sample size [20]. This study employed a sample of 30 pharmaceutical companies in India.

Data collection
Data were collected during the second half of the year 2021. A five-point Likert scale questions survey is used for conducting the research. Likert scale questions are a form of closed questions and one of the most widely used tools in researching popular opinion. They use psychometric testing to measure beliefs, attitudes, and opinions. The questionnaire was sent to pharmaceutical companies through speed post with a cover letter and also through email. The respondents were asked to answer a questionnaire of 18 questions into six topic sections including information briefly described below.
1st section: Political factors influencing the performance of pharmaceutical companies.
2nd section: Economical factors influencing the performance of pharmaceutical companies.
3rd section: Social factors influencing the performance of pharmaceutical companies.
4th section: Technological factors influencing the performance of pharmaceutical companies.
5th section: Legal factors influencing pharmaceutical companies.
6th section: Environmental factors influencing the performance of pharmaceutical companies.

Data analysis and interpretation:
Data analysis is defined as a procedure from where inspection, reorganization, amending, and transformation of data are done to extract useful information. Results were analysed using the statistical package for the social sciences[version22] and reviewed to get rid of errors resulting from entry coding and recoding of information to get rid of outliers before running analysis. As reported by [21], SPSS is widely used software for quantitative research to explore the critical data by some simple method and to develop the explanation of social research analytically. As stated in [22], Descriptive statistics aggregate data that are grouped into variables to examine typical values and the spread of values for each variable in a data set which summarizes typical values as measures of central tendency and variability whereas inferential statistics go beyond describing a data set which can help

researchers conclude from a sample into the population. In inferential statistics, chi-square tests are used to examine the association between the categorical variables of the independent variable and the dependent variable. In this, the dependent variable is the performance of the pharmaceutical companies and the independent variable is the macro environmental factors. The answers were dichotomized between values 1, 2 and 3. The independent variable is categorised into not agreed, agreed, no changes based on the answers given by the respondents, and the dependent variable is categorised into affected and not affected the performance of the company. The associations were calculated using the chi-square test of association. For the comparison of the various factors, descriptive statistics were used. Further, for better visual representation, a histogram was used which is an example of a bar graph that depicts a probability distribution in some data or sample.

Hypothesis:
Based on the review of research, the following hypotheses may be formulated
Hypothesis 1: There is no significant association between the environmental factor (political) and the performance of the pharmaceutical industries.
Hypothesis 2: There is no significant association between the environmental factor (economic) and the performance of the pharmaceutical industries.
Hypothesis 3: There is no significant association between the environmental factor (social) and the performance of the pharmaceutical industries.
Hypothesis 4: There is no significant association between the environmental factor (technological) and the performance of the pharmaceutical industries.
Hypothesis 5: There is no significant association between the environmental factor (legal) and the performance of the pharmaceutical industries.
Hypothesis 6: There is no significant association between the environmental factor (environmental) and the performance of the pharmaceutical industries.

IV. RESULTS

Table1: Descriptive statistics for the factors and the performance of the pharmaceutical industries.

Macro-environmental factors	N	Min	Max	Mean	Std. Deviation
Political	15	1.00	3.00	1.9333	0.79881
economic	15	1.00	3.00	1.8667	0.74322
Social	15	1.00	3.00	1.4000	0.63246
environment	15	1.00	3.00	1.6667	0.81650
technology	15	1.00	3.00	1.8667	0.83381
Legal	15	1.00	3.00	1.7333	0.59362

From table 1, it seems that political factors have the greatest average value of the participant's estimate (M= 1.93). On the other hand, social factors have the smallest (M=1.400). Taking into account, it seems that political factors play a crucial role in the pharmaceutical industry. In contrast, social factors play only a minor role within the pharmaceutical industry.

Table 2.1: 3*2 Chi-square test of association showing the effect of macro-environmental factor (political) upon the performance of the pharmaceutical industries.

Political factor	Company		Value	Asyp. Sig. (2-sided)
	Not affected	Affected		
Not agreed	4	1	10.909	0.004
Agreed	0	6		
No changes	0	4		

The findings of the 3*2 Chi-square test of association revealed that the Pearson chi-square statistics is 10.909 (p value=0.004). P-value is less than the significance level of 0.05. Hence, we reject the null hypothesis (Hypothesis 1) and conclude that the political factor is associated with the performance of the pharmaceutical industry.

Table 2.2: 3*2 Chi-square test of association showing the effect of macro-environmental factor (economic) upon the performance of the pharmaceutical industries.

Economic factor	Company		Value	Asymp. Sig. (2-sided)
	Not affected	Affected		
Not agreed	4	1		
Agreed	0	7	10.909	0.004
No changes	0	3		

The findings of the 3*2 Chi-square test of association findings revealed that the Pearson chi-square statistics is 10.909 (p value=0.004). P-value is less than the significance level of 0.05. Hence, we reject the null hypothesis (Hypothesis 2) and conclude that the economic factor is associated with the performance of the pharmaceutical industry.

Table 2.3: 3*2 Chi-square test of association showing the effect of macro-environmental factor (social) upon the performance of the pharmaceutical industries.

Social factor	Company		Value	Asymp. Sig.(2-sided)
	Not affected	Affected		
Not agreed	4	6	2.727	0.256
Agreed	0	4		
No changes	0	1		

The findings of the 3*2 Chi-square test of association revealed that the Pearson chi-square statistics is 2.727 (p

       3

value=0.256). P-value is more than the significance level of 0.05. Hence, we accept the null hypothesis (hypothesis 3) and conclude that the social factor is not associated with the performance of the pharmaceutical industry.

Table 2.4: 3*2 Chi-square test of association showing the effect of macro-environmental factor (technological) upon the performance of the pharmaceutical industries.

Technologi cal factor	Company		Value	Asymp. Sig. (2-sided)
	Not Affected	Affect ed		
Not agreed	4	2	8.182	0.017
Agreed	0	5		
No changes	0	11		

The findings of the 3*2 Chi-square test of association revealed that the Pearson chi-square statistics is 8.182 (p value=0.017). P-value is less than the significance level of 0.05. Hence, we reject the null hypothesis (hypothesis 4) and conclude that the technological factor is associated with the performance of the pharmaceutical industry.

Table 2.5: 3*2 Chi-square test of association showing the effect of macro-environmental factor (legal) upon the performance of the pharmaceutical industries.

Legal factor	Company		Value	Asymp. Sig. (2-sided)
	Not affected	Affecte d		
Not agreed	3	2	8.864	0.012
Agreed	0	9		
No changes	1	0		

The findings of the 3*2 Chi-square test of association revealed that the Pearson chi-square statistics is 8.864 (p value=0.012). P-value is less than the significance level of 0.05. Hence, we reject the null hypothesis (Hypothesis 5) and conclude that the legal factor is associated with the performance of the pharmaceutical industry.

Table 2.6: 3*2 Chi-square test of association showing the effect of macro-environmental factor (environmental) upon the performance of the pharmaceutical industries.

Environmental factor	Company		Value	Asymp. Sig.(2-sided)
	Not affected	Affected		
Not agreed	1	0	2.983	0.225
Agreed	2	8		
No changes	1	3		

The findings of the 3*2 Chi-square test of association revealed that the Pearson chi-square statistics is 2.983 (p value=0.225). P-value is more than the significance level of 0 .05. Hence, we accept the null hypothesis (Hypothesis 6) and conclude that the environmental factor is not associated with the performance of the pharmaceutical industry.
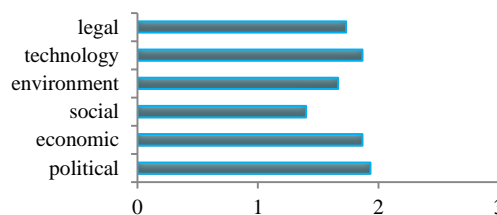

Figure 1: Impact of macro-environmental factors on the performance of the pharmaceutical factors.

The above figure represents the impact of macro-environmental factors (political, economic, social, technology, legal, environmental) on the performance of the pharmaceutical industries. We compared the mean values of each macro-environmental factors. It is evident from the above figure that the political factors show more impact and social factors show less impact on the performance of the pharmaceutical companies whereas the legal and economic have the same influence on the pharmaceutical industries.

V.   DISCUSSION

The research was conducted to gain insights into the impact of macro-environmental factors upon the performance of the pharmaceutical industries in India. The results of the chi-square test of association indicate that there is a significant association between the performance of the pharmaceutical industries and the macro-environmental factors such as political, economic, technological, legal and there is no association between the performance of the pharmaceutical industries and the macro environmental factors social and environmental factors. It is clear from both the inferential and descriptive statistics that macro-environmental factors such as the political, economic, technological, legal effect the pharmaceutical industries either positively or negatively as compared to social and environmental factors.

[23] States that with the change in political parties, several changes are seen in the market in terms of trade, taxes, duties, codes, and practices, market regulations, etc., Some of the factors involved are regulatory framework, pricing pressure, and monopolistic condition. Less pricing pressure for life-saving drugs like insulin, making it difficult for the larger companies to get profit, a barrier to entry for a new competitor in the pharmaceutical industry, a regulatory framework consisting of numerous governmental agencies, and various drug-related laws. If a pharma company fails to follow those regulations, its business may suffer a lot.

If an economic condition of a country gets affected the pharmaceutical industry also gets affected. Some of the remarkable changes in the economic condition of India include the GST implementation and the demonetization of money and the covid 19 impact. The impact of covid 19 has seriously disrupted the healthcare industry by

damaging the entire supply chain from raw materials to manufacturing and delivery. However, the number of deals made in the Indian market increased by 22% from 2019 for manufacturing anti-viral therapeutical vaccines. During the period of demonetization, one of the surveys suggested that companies that are more into acute therapies experienced around 12-15 percent lower sales assuming the same level of inventory the previous week of the demonetization Whereas in the chronic segment, a rise on the first and second week of demonetization is seen followed by a drop in the third week [24]. The enactment of the goods and services tax (GST) caught the attention of all the industries especially the pharmaceutical industries because the manufacturing cost has increased. Even though, the pharmaceutical industry of India has restored from GST impacts with correction in drug inventory of stockiest [25].

Monitoring one's health by doing exercises, eating healthy has become a trend of the current generation which leads to the lesser requirement of doctors and general physicians which in turn leads to a lesser requirement for drugs as they lead to a healthier lifestyle without the heads for drugs [26]. In contrast with the results of the chi-square test of association, some of the theories show that social factors have a significant impact on the pharmaceutical industry. Demographic factors are the socio-economic characteristics of a population such as age, gender level of education, amount of income, marital status, occupation, religion, birth rate, and death rate. The current population has a larger number of older generations hence the number of sick people is higher which drives the pharmaceutical industry to its growth. Even though these factors led to the growth of the pharmaceutical company.

As stated in [27], the technology can improve the pharmaceutical manufacturing business by maximizing efficiency which is achieved through automation, better product quality, improved safety, shorter work time for labor. Thus, technology is transforming the manufacturing industry by reducing design to production time, reducing manufacturing lead time, reducing waste, and ensuring great flexibility in production. D.Pitchford states that advertising gives a new awareness of medical conditions and available treatment, informs people with a previously undiagnosed or untreated condition, and leads them to seek help. Thus, advertisement serves a positive informational role. Hence advertisement can increase sales in the pharmaceutical industry.

The development and production of pharmaceutical products are said to have a much less environmental impact than that of other industries such as the automotive industry. The environmental impact on pharmaceutical marketing does not cause any effect but the pharmaceutical industries cause harmful effects to the surrounding environment. According to Pfizer, pharmaceutical products pollute the water causing harmful effects on both the plant and animal kingdom. The growth of the lettuce and radish plants is largely impaired even at low levels of concentration in the atmosphere. Another main threat is

that discharging antibiotics into the environment can promote the natural development of antibiotic-resistant pathogens that are harder to treat. When pollutants get into our water, they affect the quality of our lakes, streams, and rivers. When these pollutants get into our drinking water, they affect the quality of our lives. If we don't take precautions, pharmaceutical pollution can also affect our health. Hence, pharmaceutical companies need to be conscious of pollution. [29], [30]

According to [31] , the government has placed strict laws and guidelines due to the frauds in the healthcare and the pharmaceutical sector. To ensure the strength of the active ingredients, quality, and purity of the final product, the manufacturing of pharmaceutical products has to be maintained at high standards. Hence, Congress passed the Kefauver Harris amendments in 1962. As a result, there were some big changes to the world of pharmaceutical marketing. Some of the big changes are
1. Drug companies had to prove the effectiveness.
2. FDA took control of regulating prescription drug advertising and labeling.
3. Drug companies could no longer market cheap generic drugs as expensive.
This change makes the international legislation strict which in turn makes it difficult for the pharmaceutical industries to enter into the international market. As a result, pharmaceutical companies have to be careful to meet all the government requirements of different countries.

VIII. CONCLUSION AND FUTURE SCOPE

The impact of macro-environmental factors affecting the performance of the pharmaceutical industries was successfully analyzed with the prime objective of detecting which factor affects the most. We analyzed the results of the questionnaire using both descriptive and inferential statistics. We had taken the performance of the pharmaceutical industries as the dependent variable and the macro-environmental factors (political, economic, social, technological, legal, environmental) as the independent variables. The following conclusions can be drawn from the statistical methods described earlier as evidence.

1. Chi-square test of association authenticated that there is a significant association between the performance of the pharmaceutical industries and the macro-environmental factors (political, economic, technological, legal and there is no significant association between the performance of the pharmaceutical industries and the macro-environmental factors (social, environmental).
2. From the descriptive statistics, we can infer that the political factor showed a more impact and the social factor showed less impact on the performance of the pharmaceutical industries when compared to the other factors. The legal factor showed an identical impact as that of the economic factor on the performance of the company.

From the above discussion, we find that the performance of the pharmaceutical industries is largely influenced by the change in the macro-environmental factor. As political, economic, technological, legal factors plays a prime most role in the performance of the pharmaceutical industries, change in the political situation of the country, economic condition of the country, national and international rules and legislations for manufacture, distribution, import and export and the technological advancements especially manufacturing machineries, distribution technology, quality control, automation and advertisements all should be in favor of the pharmaceutical industry or else the performance of the pharmaceutical industry will be largely impaired. In account of social factors, it has both the positive and negative impact on the pharmaceutical industries. Although the environmental factor didn't play any role, the pharmaceutical industry should be conscious of pollution caused by them.

Further research work has to be carried out to understand both the positive and the negative impact of the environmental factors on the performance of the pharmaceutical industries using a large sample size.

IX. ACKNOWLEDGMENT

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