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A STUDY ON THE IMPACT OF ONLINE SHOPPING SITES ON LOCAL RETAILERS WITH SPECIAL REFERENCE TO KOLLAM DISTRICT

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ABSTRACT

Views abound on the impact of the Internet and e-commerce on traditional forms of retailing. Scenarios range from, on the one hand, the almost total devastation of existing physical retailing to, on the other, limited if any impact upon "real" retailing. Despite excessive hype, spectacular failures, and the myriad of conflicting views and crystal-ball gazing, e-commerce processes and procedures provide the potential for a fundamental reassessment of how retailing operates and how retailers behave. Without a doubt, the existing ways of operating and the associated cost structures within retailing will be reassessed under the onslaught of new technology and new retail structure (1) The e-commerce market is on the rise, but that doesn't mean the retail market has gone down significantly. You don't see shopping malls closing down every other month or the retail stores of your favourite brand shutting down because the same products are available online. Yes, there has been a paradigm shift from retail to online shopping, and it has put the private sector employers in a harsh and peculiar position.

KEYWORDS

consumers, e-commerce sites, online shopping, retail industry.

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1. INTRODUCTION

Indian retail industry has emerged as one of the most dynamic and fast-paced industries due to the entry of several new players. Total consumption expenditure is expected to reach nearly US\$ 3,600 billion by 2020 from US\$ 1,824 billion in 2017. It accounts for over 10% of the country's gross domestic product (GDP) and around eight% of the employment. India is the world's fifth-largest global destination in the retail space.

India ranked 73 in the United Nations Conference on Trade and Development's Business-to-Consumer (B2C) E-commerce Index 2019. India is the world's fifth-largest global destination in the retail space and ranked 63 in World Bank's Doing Business 2019.

India is the world's fifth-largest global destination in the retail space. In FDI Confidence Index, India ranked 16 (after US, Canada, Germany, United Kingdom, China, Japan, France, Australia, Switzerland, and Italy). (3) E-business focuses on both internal and external activities of a business. Ecommerce has a lot of good and bad impacts on different areas. The key to having successful e-commerce is to reduce the negative impacts and increase the benefits at the same time (4) E-Commerce has dramatically reduced locational importance. Retailers are now able to sell their products all over the world. This has the potential to increase their revenue and customer base dramatically. Recent innovations such as e-Books have further enhanced firm welfare by creating new revenue streams from existing products. However, this competition has the potential to overwhelm some conventional retailers leading to substantial business attrition. (5) This internet revolution has had both a positive and a negative impact on businesses. The businesses which embraced technology and incorporated e-commerce into their models early enough have reaped and continue reaping the benefits of e-commerce. On the other hand, those businesses which are lagging in embracing e-commerce, are reeling from the effects of their prosaic approach in business.

2. REVIEW OF LITERATURE

Anthony d. Miyazaki and Ana Fernandez prepared a report on "Consumer perceptions of privacy and security risks for online shopping" issued in "Journal of Consumer Affairs" volume 35, issue 1, pages 27– 44, summer 2001.

EunjuKo and Doris H Kincade prepared a report on "The impact of Quick Response Technologies on Retail Store Attributes" published in "International Journal of Retail & Distribution Management.

Shanthy & Kannaiah (2015) carried out a study titled 'Consumers Perception on Online shopping' found that consumer's perception of online shopping varies from individual to individual and the perception is limited to a certain extent with the availability of proper connectivity and the exposure to the online shopping. The perception of the consumers also has similarities and difference based on their characteristics.

Argha (2014) in his study titled "Online Shopping: A Study of the Factors Influencing Online Purchase of Products in Kolkata" summarized that the internet as a medium of shopping is rapidly growing in India. The cost factor, convenience factor, product factor, and seller-related factor are the four important factors influencing the online purchase of products in Kolkata.

Sanjeev Prashar (2017) in his study "Effects of Online Shopping Values and Website Cues on Purchase Behaviour: A Study Using S–O–R Framework" summarized that this growth has been fuelled by the rapid adoption of technology, improving standards of living, an increasingly young population, and economically advancing middle class, besides increasing access to the Internet through broadband and use of smartphones and tablets. The entry of global e-commerce giants has intensified the competition for home-grown players.

Hirschman and Holbrook, (1982), suggest that "Motivations of Consumers to engage in online shopping include both utilitarian and hedonic dimension. Whereas some Internet shoppers can be described as "problem solvers" others can be termed seeking for 'fun, fantasy, arousal, sensory stimulation, and enjoyment'."

3. SIGNIFICANCE OF THE STUDY

This study attempts to focus on factors affecting The Impact of Ecommerce on Small Retailers with Special Reference to Kollam. The study is very significant because nowadays many people prefer purchasing through the e-commerce platform. E-Commerce has dramatically reduced locational importance. Retailers are

now able to sell their products all over the world. This has the potential to increase their revenue and customer base dramatically. Recent innovations such as e-Books have further enhanced firm welfare by creating new revenue streams from existing products. However, this competition has the potential to overwhelm some conventional retailers leading to substantial business attrition.

4. STATEMENT OF THE PROBLEM

Ecommerce has had both a positive and a negative impact on businesses worldwide. Some small businesses view e-commerce as a tool developed by the big established market leaders to help them reach an even wider audience and kill off competition from startups while other small businesses view e-commerce as a platform to show themselves to the world and put up a fight against the big established market leaders. The trends in the e-commerce industry play a pivotal role in changing the fate of the entire retail business. Ecommerce has a great impact on the retail industry influencing the latter to offer an equally engaging shopping experience. The E-commerce business in India has seen exponential growth over the last decade. This growth is due to many contributory factors, including the rapid adoption of technology by Indian consumers, large increases in the number of internet users, new enabling technologies, innovative business models, and alternative payment options offered by E-commerce companies.

5. SCOPE OF THE STUDY

The geographical scope of the study is confined with special reference to the Kollam district only and has been undertaken to analyze the impact of e-commerce on small retailers alone.

6. OBJECTIVES

1. To study online shopping and its effect on offline retail shopping sectors.
2. To Study the problem faced by the small retailers after introducing the local e-commerce applications.
3. To analysis the changes in customers buying pattern in the Covid 19 scenario.

7. RESEARCH METHODOLOGY

The validity of any research is based on a systematic method of data collection and proper analysis of the data collected. The methodology adopted for the proposed study is given below.

- **SOURCE OF DATA:** Both primary and secondary data sources were used for carrying out the study. Primary data were collected with the help of a structured questionnaire. While secondary data obtained from periodicals, journals, magazines, newspapers, websites, books, and other reference materials.
- **SAMPLING DESIGN:** The sampling technique followed in this study is convenient sampling which is the classification of the non-probability method. The total sample selected for the study is 100
- **TOOLS FOR ANALYSIS:** The data collected were classified and analyzed based on the objectives of the study. For analysis statistical techniques like percentages, tables, and chi-square test were used. The chi-square test was applied to examine the significance of variations in the opinion among the impact of e-commerce on small retailers.

8. HYPOTHESIS

- H01: The entrance of e-commerce platform has not affected the retailers
- H11: The entrance of e-commerce platforms has affected the retailers.
- H02: There is not at all any change in the consumer buying behavior in the covid-19 pandemic.
- H12: There is a change in the consumer buying behavior in the covid-19 pandemic.

9. LIMITATIONS OF THE STUDY

- The study has been only confined to the small retailers affecting the impact of e-commerce platforms.
- The study is based on the primary data collected from 300 small retailers in Kerala state and therefore the results of the study cannot be generalized.
- This study is purely an academic one and doesn't free from the constraints of time and money.

10. RESULTS AND DISCUSSION

TABLE 1: DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Particulars	No. of Respondents	Percentage (%)
Type Of Shop	Grocery	12
	Textiles	14
	Restaurant	20
	Mobile Shop	24
	Bakery	30
Monthly Sales Turnover	Upto 150000	40
	150000-250000	42
	250000-350000	10
	Above 350000	8
Educational Qualification	SSLC	18
	HSS	28
	Graduate	32
	Post Graduate	10
	Others	12
Total	100	100

Source: Primary data

Interpretation: As regards the above table only 12% of respondents are running grocery stores. About 14% of individuals are textile owners. The percentage of people who are involved in restaurant and mobile shop are 20 & 24 respectively. 30% of respondents are concentrated in bakery businesses. In the case of monthly sales turnover, 40% of individuals having an income up to 150000 only. 42% of respondents' sales turnover is between 150000 & 250000. About 10% of respondents earn from 250000 to 350000 monthly. Only 8% of respondents can earn above 350000. In the case of educational qualification majority of the respondents that is 32% are graduated. About 28% of individuals completed their higher secondary education. 18% of respondents have matriculation as their higher qualification. Only 10% of individuals pursued their master's degrees. 12% constitute other categories.

TABLE 2: HOW HAS THE ENTRANCE OF E-COMMERCE GIANTS AFFECTED YOUR BUSINESS?

Type Of Retailer	Increase the sales		Decrease the sales		No Change	
	No	%	No	%	No	%
Grocery	4	4	6	6	2	2
Textiles	6	6	6	6	2	2
Restaurant	4	4	14	14	2	2
Mobile Shops	2	2	18	18	4	4
Bakery	2	2	26	26	2	2
Total	18	18	70	70	12	12

Source: Primary data

The admittance of e-commerce giants has a massive impact on different types of retailers in a different ways. Out of the 12 grocery retailers, 4% have an increase in their sales, 6% have a decline in their sales, 2% have no change in their sales. In the case of textile shops, 6% of retailers' sales were increased and the same 6% has a decrease in their sales. 2% have no change in the sales. 20 restaurants are respondents to the question. Among that 20, 14% have a decline in their sales volume, 4% have an increment in their sales quantity, 2% have no change in their sales. In the case of mobile shops, amidst the 24 respondents, only 2% have an increase in sales and 4% have not at all any change in their sales. For bakery retailers, only 2% have increased their sales. The 26% of respondent's sales is declined due to the entry of various e-commerce sites. 2% of individuals have no change in their sales volume.

TABLE 3: HAVE YOU EVER FELT THE NEED OF SWITCH ON YOUR BUSINESS TO ONLINE PLATFORM? IF SO WHAT ARE THE DIFFICULTIES THAT YOU MIGHT FACE?

Particulars	No. of Respondents	Percentage(%)
Higher Capital Intensive Cost	40	40
Low-Profit Margin	4	4
Competition	2	2
Lack Of Technical Knowhow	36	36
Fear Of Change	8	8
Have not any intention to switch the business into online	10	10
Total	100	100

Interpretation: In the opinion of the majority of retailers, that is 40% of respondents, the higher capital intensive cost is the restricting factor to switch their business online. About 36% of retailers acknowledged that lack of technical know-how was pulling them back while entering into an online platform. Only 8% have fear of change. 2% of total respondents consider competition as the restricting factor. In the perspective of 4% of retailers, the low-profit margin was confined to them to involve in online business. And the remaining 10% have not at all any intention to switch their business into the online platform.

TABLE 4: HAVE YOU EVER TRADED YOUR BUSINESS ONLINE? IF YES, WHAT WAS YOUR EXPERIENCE?

Particulars	No. of Respondents	Percentage(%)
Best	16	16
Better	10	10
Good	8	8
Bad	6	6
Not tried yet	60	60
Total	100	100

Source: Primary data

Interpretation: From the respondents, those who were traded their business at least once had the best experience. The 26% depicts that fact. 26% had better and best experience through online trading. 8% of respondents had good experience. 6% of individuals' experience was bad. And the vast majority 60% have not tried their business online.

TABLE 5: HOW THE OUTBREAK OF COVID-19 PANDEMIC HAS AFFECTED YOUR OFFLINE BUSINESS?

Type of Retailer	Increase the sales		Decrease the sales		No Change	
	No	%	No	%	No	%
Grocery	2	2	6	6	4	4
Textiles	2	2	9	9	3	3
Restaurant	3	3	14	14	3	3
Mobile Shops	0	0	7	7	17	17
Bakery	3	3	24	24	3	3
Total	10	10	60	60	30	30

Source: Primary data

The outburst of covid-19 has affected offline retailers very badly. The admittance of e-commerce giants has a massive impact on different types of retailers in a different way. Out of the 12 grocery retailers, 2% have increased their sales, 6% have a decline in their sales, 4% have no change in their sales. In the case of textile shops, 2% of retailers' sales were increased and 9% has a decrease in their sales. 3% have no change in the sales. 20 restaurants are respondents to the question. Among that 20, 14% have a decline in their sales volume, 3% have an increment in their sales quantity, 3% have no change in their sales. In the case of mobile shops, amidst the 24 respondents, no one has an increase in sales 7% has a decrease in sales and 17% have not at all any change in their sales. For bakery retailers, only 3% have an increase in their sales. The majority, that is 24% of respondents' sales is declined due to the entry of various e-commerce sites. 3% of individuals have no change in their sales.

CHI SQUARE TEST & TESTING OF HYPOTHESIS

H01: THE ENTRANCE OF E-COMMERCE PLATFORM HAVEN'T AFFECT THE RETAILERS

TABLE 6

Type Of Retailer	Increase the sales	Decrease the sales	No Change
Grocery	4	6	2
Textiles	6	6	2
Restaurant	4	14	2
Mobile Shops	2	18	4
Bakery	2	26	2
Total	18	70	12

Source: Primary data

Interpretation: By applying the Chi-Square test on the observed data the significance of the data found and tested hypothesis. The critical value of X² is X² 0.05,8=15.507 where degree of freedom = (no of rows-1) * (no of columns-1) = 4 * 2 = 8. The calculated X² value for the above table is 16.08. At 95% confidence

level, the calculated X^2 value is more than the X^2 critical, therefore the null hypothesis is rejected and concluded that there is a significant relationship between the entrance of e-commerce sites and its effect on the retailers.

HO2: THERE IS NOT AT ALL ANY CHANGE IN THE CONSUMER BUYING BEHAVIOUR IN COVID-19 PANDEMIC

TABLE 7

Type Of Retailer	Increase the sales	Decrease the sales	No Change
Grocery	2	6	4
Textiles	2	9	3
Restaurant	3	14	3
Mobile Shops	0	7	17
Bakery	3	24	3
Total	10	60	30

Source: Primary data

Interpretation: By applying the Chi-Square test on the observed data the significance of the data found and tested hypothesis. The critical value of X^2 is $X^2_{0.05,8}=15.507$ where degree of freedom = (no of rows-1) * (no of columns-1) = 4 * 2 = 8. The calculated X^2 value for the above table is 29.25. At 95% confidence level, the calculated X^2 value is more than the X^2 critical, therefore the null hypothesis is rejected and concluded that there is a significant relationship between the change in consumer buying behavior and covid-19 pandemic

11. FINDINGS

- Majority of respondents that is 30 % are running bakery shops.
- 42% of respondents came under the turnover slab above 350000
- 32%, that is the vast majority are graduated.
- The wild majority,90% have felt the need to switch their business online, but 40% of the retailer have the problem of higher capital intensive cost. And lack of technical knowledge restricts the 36% of the retailers
- Among all the respondents only 40% were tried online business, and 16% have the best experience from it.
- It is also identified from the table that there is a significant relationship between the entrance of e-commerce sites and its effect on the retailers. By the entry of e-commerce sites, 70% of respondent's sales value decreased.
- The table depicts that there is a significant relationship between the change in consumer buying behavior and the covid-19 pandemic because 60% of shops have lost their offline business.

12. CONCLUSION

In a fast-moving world like ours, everything around us has a new face now. Even our daily life also has changed following it. Changing shopping style is one of the new reflected faces of our daily routine. Nowadays customers prefer online shopping to offline. The advent of technology in the recent period being the primary reason for it. Today, retailing means without going into shopping centers, just add everything you want into your cart with one click. In all these effects the local retailers lost their positions in the market. They can't compete with the large e-commerce giants but the nearby stores in our locality always there in our difficulties, even during pandemic times or floods and other natural calamity challenges. It needs to revive not just survive. The retail stores need to simply uplift their pattern of business and face the competitive world with a more positive outlook. E-stores and retail stores both have to survive, none at the cost of the other. It's not just about the livelihood it gives to the thousands of people but also the convenience and the steadfastness of a fixed retail store. Retailers have to change their attitude towards the market. Today's is a consumer market and as a result, the priority is consumer satisfaction. The firm has to be in the good books of the consumer. Better quality products, fair price, and friendly after-sale services are the basic areas in which the business has to concentrate to a remarkable extent. Additional services should be provided to the consumers to woo them and build upon loyalty which in turn would ensure stable sales in the years to come.

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PREDICTION OF BLUE CHIP STOCK PRICES USING ARTIFICIAL NEURAL NETWORK (ANN)**AJITH K****STUDENT****MBA (FINANCE MANAGEMENT)****SCHOOL OF BUSINESS MANAGEMENT****CHRIST (DEEMED TO BE UNIVERSITY)****BANGALORE****Dr. RAMESH CHANDRA BABU T****ASSOCIATE PROFESSOR****SCHOOL OF BUSINESS MANAGEMENT****CHRIST (DEEMED TO BE UNIVERSITY)****BANGALORE****ABSTRACT**

The fluctuations in the Stock prices has a considerable amount of attention. This paper is built on the previous research and seeks to determine whether improvements can be made in forecasting of ten most active Blue-Chip Stocks. This study is an attempt to predict the direction of the movement of the closing value of stocks of IT and Banking Sector. The attempt of several methods like fundamental analysis, technical analysis, statistical analysis and time series analysis to predict the price were not consistently successful. Artificial neural network (ANN) helps to recognize unknown or hidden patterns in data which are optimum to predict the share market. Time series data is considered for the analysis. The sample used for this analysis consists of five-year data of sectoral indices of IT and Bank, with 5 IT companies and 5 Banks, from 1st April 2015 to 31st March 2020. The network model was built on feed-forward algorithm and back propagation algorithm and the highest accuracy was reported by the back propagation model. There can be fluctuations in the prices due to the ongoing pandemic to which we can witness huge insignificant in the forecast.

KEYWORDS

artificial neural network (ANN), feed-forward, back propagation, hidden patterns.

JEL CODES

G11, G14, G31.

INTRODUCTION

With the ever-increasing and expanding economy, the Indian economy is seen as a growth engine of the world economy, and the stock market of such a robust economy is the face of the growing market and enterprises within it. India has one of the oldest and fastest forum on the stock market, namely the Bombay Stock Exchange (BSE). Essentially the stock market is an online forum where the firm's equity is listed and exchanged. Because of this innovative framework, businesses can efficiently and effectively raise money from the market. In terms of foreign institutional investment and transaction turnover, stock exchanges have grown exponentially with the country's economic reforms. This increase is mainly due to liberalized and supportive along with the regulative role of government.

Stock market prediction, despite its prevalence, remains a secretive, empirical art. Few people, if any, are willing to share what strategies they have for success. The hope is that investors will be better equipped to prevent another financial crisis, with a greater understanding of how the market moves. Portfolio management is largely an extra step after an investor has predicted which direction any particular stock is going to move in. The investor may choose to allocate funds across a variety of stocks in a way that minimizes its risk. For example, the investor may choose not to spend all of their funds in a single enterprise, lest the enterprise takes an unexpected turn. A more common approach would be for an investor to invest across a wide range of stocks, depending on certain parameters that he has previously decided on. This research would focus solely on forecasting the daily pattern in sectoral indices (price movement). The proposal would make no attempt to determine how much money each forecast should be allocated. More so, the project will evaluate those predictions' accuracies.

STOCK EXCHANGES IN INDIA

Stock Exchange (also known as the stock market or share market) is a significant integrated part of India's capital market. It plays an essential role in a country's growing industries and trade which ultimately affects the economy. It is a well-organized market for buying and selling corporate and other securities which facilitate companies to raise capital by pooling funds from various investors as well as serving as an investment intermediary for investors. In addition, it ensures that securities are traded according to certain predefined rules and regulations. There are 7 stock exchanges in India out of which the two largest indices are NSE and BSE. Many Indian Stock Market trade happens on those two stock exchanges. All markets observe the same trading hours, system of trade, method of settlement, etc. BSE consists of 5800 listed firms at the last count, while its counterpart NSE consists of 1659 listed firms at the other.

BLUECHIP STOCKS

Blue-chip stocks are usually referred to as stocks that have a high return and high market capitalization. These stocks usually comprise of companies that have a very good reputation in the market. The market capitalization of blue-chip stocks is often in the billions. Commonly, the market leader or the top companies in the respective sector are the blue-chip stocks. Blue-chip stocks are a preferred investment option to many investors for achieving their long-term financial goals. Blue-chip stocks offer returns that are usually high, they provide corpus building, provide portfolio diversification. These reasons make blue-chip stocks even more desirable.

REVIEW OF LITERATURE

Noraini Abdullah (2015), the paper attempted to forecast the export price of Sabah Sawn timber using a neural network. The study incorporates a mathematical approach for a more competitive industry, using Artificial Neural Network (ANN) to model the export price of sawn timber. Using the MATLAB version 7.11.0 R2010b Toolbox, ANN is solved with one dependent (export price) and two independent variables (quantity and unit value). Sabah Department of Statistics from 1991 to 2009 collected data on the sawn timber export price of 228 observations. The best model in ANN is determined based on the eight selection criteria (8SC) with the maximum decision coefficient value (R2) and the minimum square error mean (MSE) and residual standard values. The mean average prediction error

(MAPE) is essentially used to check the validity of the 12 best models. Statistics show the best approximation using ANN is the fourth single layer with a polynomial of fifth-degree.

Murtaza Roondiwala et.al. (2017), in their article study the use of d Long Short-Term Memory (LSTM) in stock price prediction. In order to forecast stock market indices, the paper focuses on the recurrent neural network (RNN) and long short-term memory (LSTM) approaches. The paper has been modeled and it forecasted NIFTY 50 stock returns using LSTM. Five years of NIFTY 50 historical data were collected and used for the model's training and validation purposes. After running various simulations with a different number of parameters and epochs, it was found that with 4 features set (High/Low/Open/Close) with 500 epochs, the best results were obtained with 0.00983 RMSE training and 0.00859 RMSE research. The authors concluded that in order to help predict the stock indices, a forecasting model with good accuracy is required.

Dr. Nigama. K, Dr. R Alamelu, et. al. (2019), in their study explores the Bombay's stock market trend's forecasting potential for stock prices using genetically engineered neural networks, the input being the closing price of the previous five years and the output being the price for the next day. As measures of success, risk (standard deviation), average return, variance and market price are selected. The purpose of this article is to provide an overview of the use of an artificial neural network to forecast the stock market. The analysis also explains the conceptual context and characteristics of ANN in the forecasting of stock prices. The conventional financial forecasting approaches were outperformed by neural networks. The predicted outcome showed that ANN was able to more accurately forecast stock prices. The use of the artificial neural network in stock market forecasts is calculated by a very low forecasting error shown by testing and training results.

Wajira Dassanayake, Chandimal Jayawardena, et. al. (2019), The aim of this review is to discuss various techniques used in stock market price forecasting, with particular focus on hybrid models. This review paper classifies, in accordance with its input characteristics, the literature relating to hybrid models applied to stock market price prediction, allows distinctions between hybrid models and presents the performance assessment measures used. It summarizes the salient features of the latest models used in stock market price and index forecasting. The research papers indicate that hybrid models are frequently used for stock market forecasting.

Penglei Gao, Rui Zhang, et. al. (2020), in their paper in machine learning, implement four different techniques, including three standard models of machine learning: Multilayer Perceptron (MLP), Long Short Term Memory (LSTM) and Convolutional Neural Network (CNN) and one neural network focused on attention. As inputs containing the daily trading results, technical indicators and macroeconomic variables, seven variables are selected. The findings show that among the alternative models, the attention-based model has the best results. In addition, in the developed financial market, all the models adopted have better accuracy than those developed.

RESEARCH GAP

Usually, time series strategies are used for the predictions of various Securities in the Stock market. There is some work that needs to be redesigned with the help of the econometrics issue, but the usage of multivariate strategies that go above traditional regression modelling, which are constrained work in nature.

NEED FOR THE STUDY

In a developing country like India, stocks in the stock market play an important factor in generating income, and the price movements in the stocks have a major impact on economic performance. Growing and leading companies, hospitals, educational institutions, textile and steel plants, chemical industries, pharmaceutical companies, and so forth are making huge investments in the stock markets. Investors must be fully aware of the futures market to avoid any risk that occurs at any time due to the market trend's chaotic behavior. The ultimate goal of the investor is to make a profit from their investments in the shares related to their respective stock price index. Consequently, the potential stock market forecast becomes the method of warning for both short-term and long-term investors against the unforeseen business scenario danger. Therefore, forecasting stock prices serves as a key input for the economic development policy planning and formulations. Making attempts in forecasting various stock prices using advanced economic models which were used for short to medium term actual stock forecasting.

OBJECTIVES OF THE STUDY

To Forecast the stock prices of the companies under study using Feed-Forward method under Artificial Neural Network (ANN) Model

To Forecast the stock prices using Elman Back Propagation under Artificial Neural Network (ANN) Model

To compare the accuracy between the methods with real data.

METHODOLOGY

TYPE OF RESEARCH

It is a comparative analysis. Quantitative research is the systematic empirical study of observable phenomena through statistical, mathematical, or computational techniques. The scientific work seeks to establish and recruit phenomena-related mathematical models, theories, and hypotheses. Quantitative research is a kind of strategy that focuses on collection and analysis of numerical data. The measuring method is crucial to quantitative research, as it provides the fundamental link between empirical observation and mathematical interpretation of quantitative relationships.

PERIOD OF STUDY

Data were collected on a daily frequency from 01, April 2015 to 31, March 2020

TYPE OF DATA

The dataset consists of ten dependent variables and two independent variables. The ten dependent variables are the top 3 Companies of IT sector and the top 3 banks of the Banking sector which are listed in the Stock exchange of India (both BSE and NSE) and the independent variables are the Nifty IT Index and Bank Nifty Index.

The variables can be categorized under following factors:

Independent variable:

- Nifty IT Index Price
- Bank Nifty Index price

Dependent variables:

- TCS stock price
- Wipro stock price
- HCL stock price
- HDFC stock price
- Kotak stock price
- SBI stock price

SOURCE OF DATA

The data were collected from various reliable secondary data sources online.

TOOLS FOR ANALYSIS OF DATA

Artificial Neural Networking

An artificial neuron network (ANN) is referred to as a computational model based totally at the shape and capabilities of biological neural networks. The Statistics that has movement via the network influences the form of the ANN due to the fact a neural network change - or learns, in a feel - based mostly on that input and

output. ANNs are considered nonlinear statistical information modelling tools wherein the complex relationships among inputs and outputs are modelled or patterns are determined. ANN is also referred to as a neural network. An ANN contains several blessings but, one of the maxima identified of those is the reality that it is able to certainly examine from observing information sets. In this way, ANN is used as a random function approximation device.

STATISTICAL TOOLS FOR ANALYSIS OF DATA

1. Normalising data using Excel
2. FF method of Artificial Neural Network using MATLAB
3. BP method of Artificial Neural Network using MATLAB

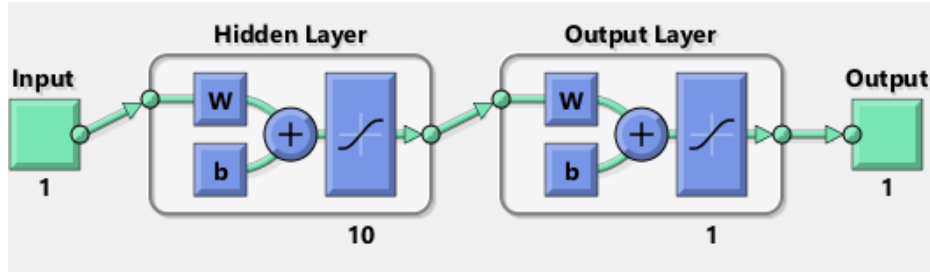
RESULTS AND DISCUSSIONS

ARTIFICIAL NEURAL NETWORKING ANALYSIS

FFBP and BP model Using MATLAB was performed with the 10,000 iterations and with max error as 1e-12 specification and the results are as follows:

Feed-Forward Neural Network

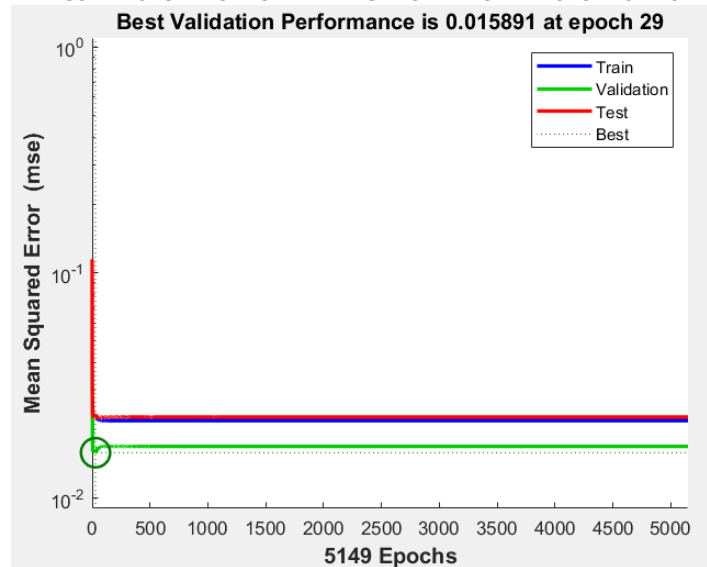
FIGURE 1: SHOWING ANN MODEL USING FFBP



IT INDUSTRY using FFBP

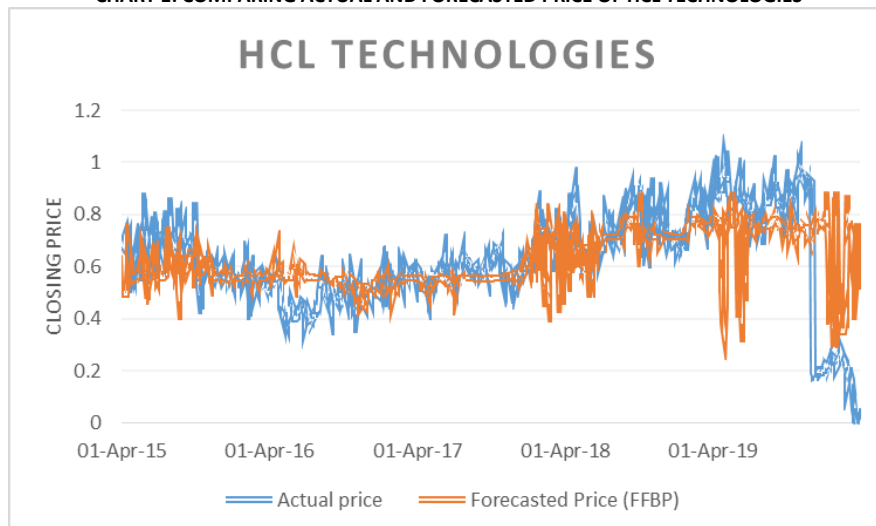
- Company: HCL Technologies

FIGURE 2: SHOWING NEURAL NETWORK OF PERFORMANCE OF HCL TECHNOLOGIES
Best Validation Performance is 0.015891 at epoch 29



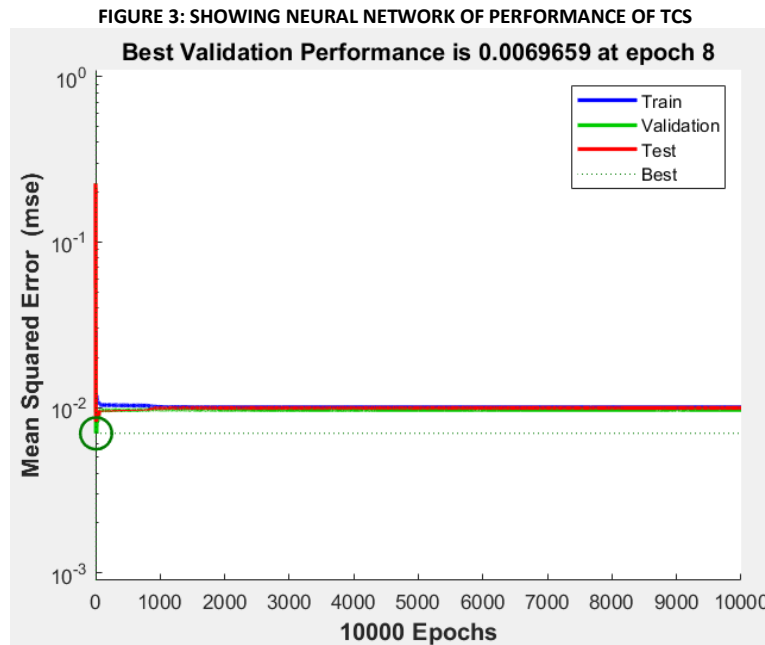
Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted. The graph shows the line of best fit for all the data; it is basically a representation of $y=mx+c$.

CHART 1: COMPARING ACTUAL AND FORECASTED PRICE OF HCL TECHNOLOGIES

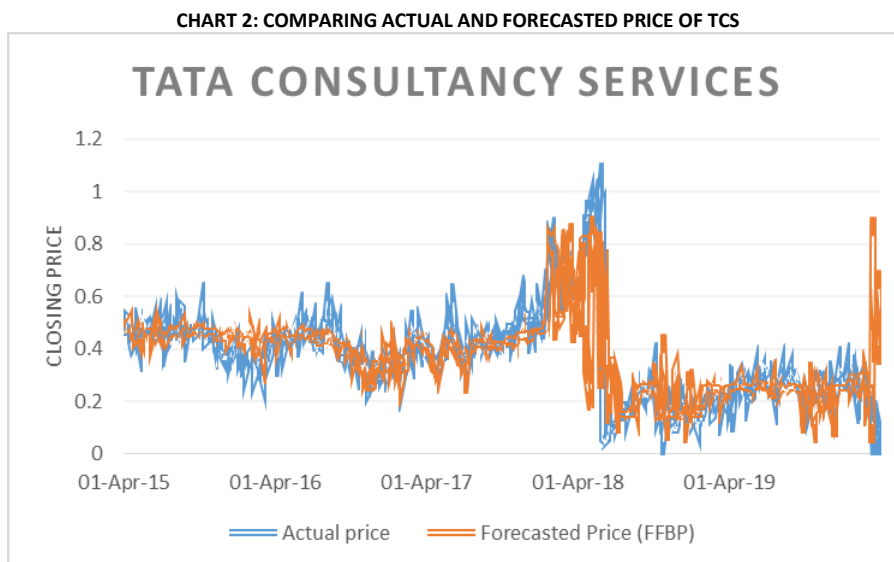


The forecasted values are following a downward or bearish trend. It denotes that the share prices of HCL Technologies are falling. In a situation like this it is advised for existing shareholders to sell the shares. Investors can sell the shares and buy them back at a lesser price thus making a capital gain. Investors can also go for short selling, and investors who are not holding shares of HCL are advised to wait and buy later.

- Company: Tata Consultancy Services (TCS)

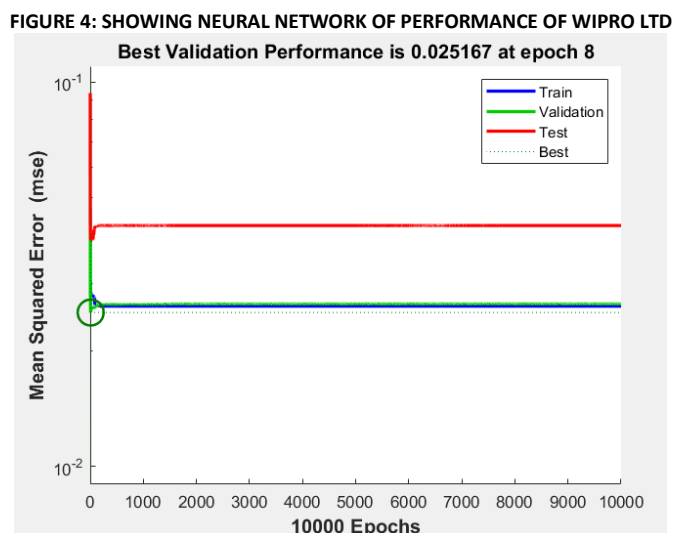


Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted. The graph shows the line of best fit for all the data; it is basically a representation of $y=mx+c$.

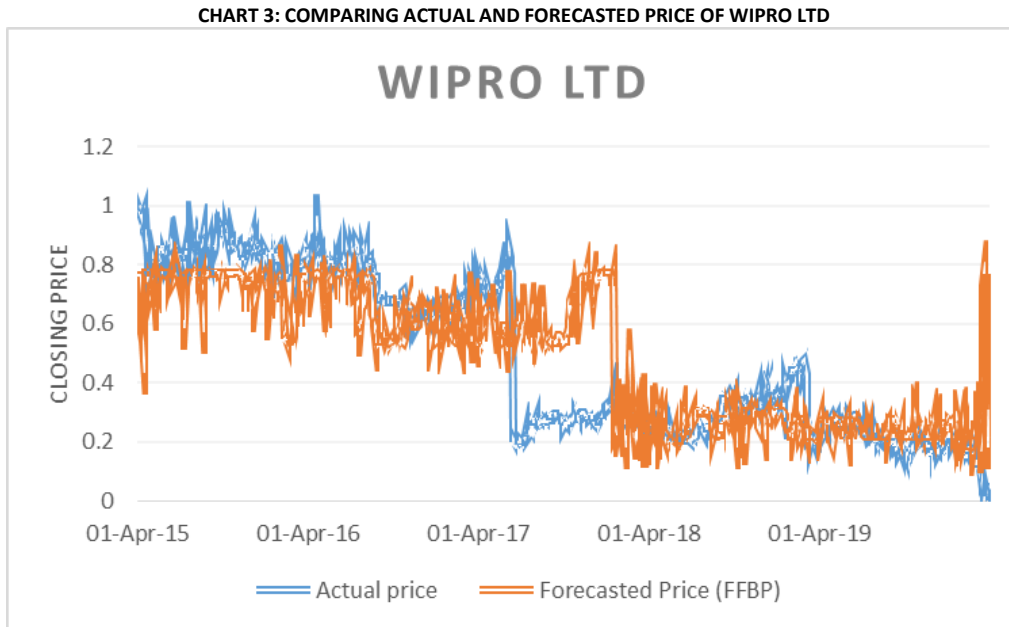


The forecasted values show an upward or bullish trend. It denotes that the share prices of TCS are rising. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of TCS are advised to buy them.

- Company: Wipro Ltd



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted. The graph shows the line of best fit for all the data; it is basically a representation of $y=mx+c$.

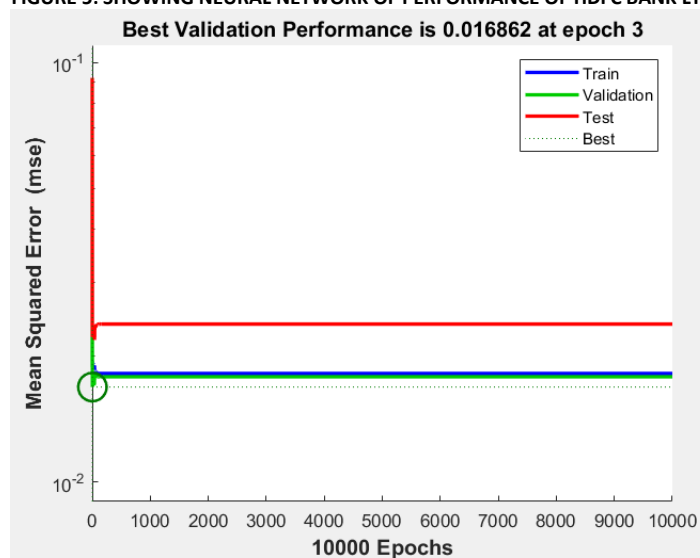


The forecasted values show an upward or bullish trend. It denotes that the share prices of Wipro are rising. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of Wipro are advised to buy them.

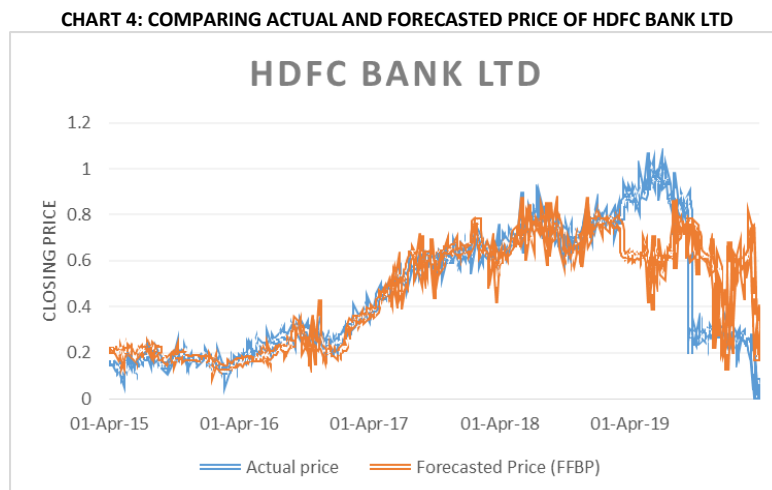
BANKING INDUSTRY USING FFBP

- Company: HDFC Bank Ltd

FIGURE 5: SHOWING NEURAL NETWORK OF PERFORMANCE OF HDFC BANK LTD
Best Validation Performance is 0.016862 at epoch 3



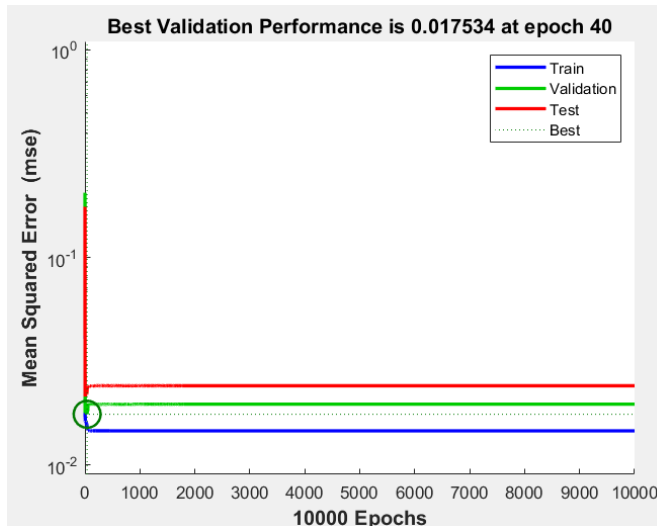
Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted. The graph shows the line of best fit for all the data; it is basically a representation of $y=mx+c$.



The forecasted values indicate a downward trend and it is expected to see an upward trend in the near future. It is observed that the share prices of HDFC will rise in coming days. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of HDFC are advised to buy them as there is going to be a rise.

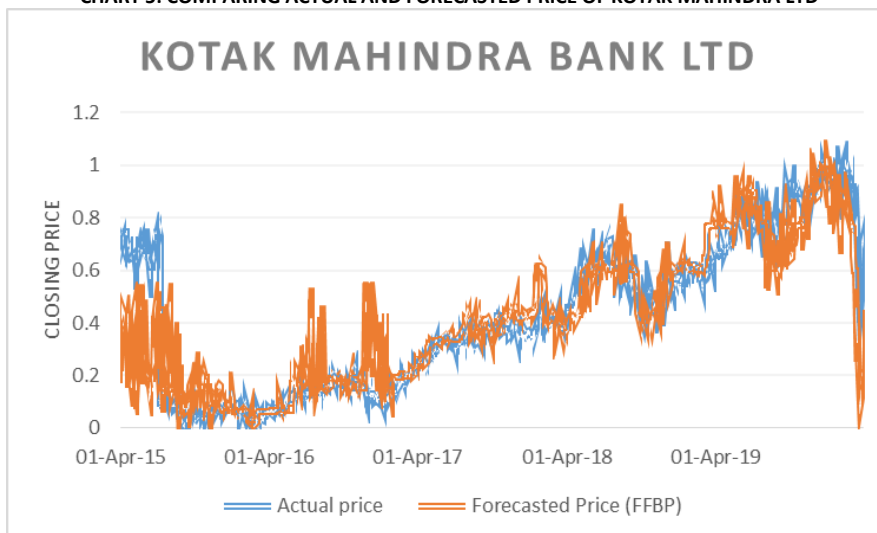
- Company: Kotak Mahindra Bank Ltd

FIGURE 6: SHOWING NEURAL NETWORK OF PERFORMANCE OF KOTAK MAHINDRA BANK



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted. The shows the line of best fit for all the data; it is basically a representation of $y=mx+c$.

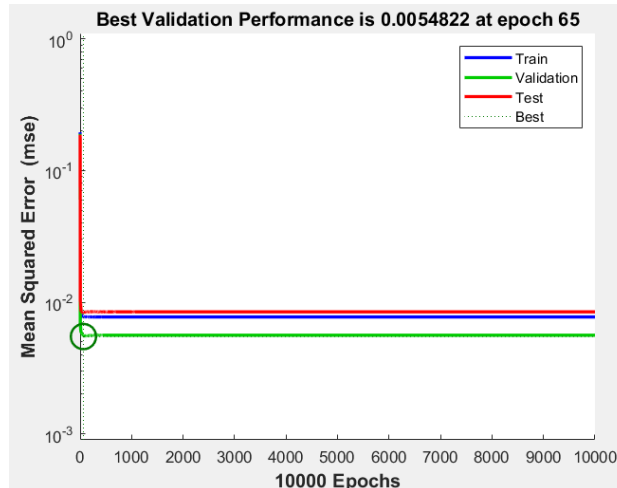
CHART 5: COMPARING ACTUAL AND FORECASTED PRICE OF KOTAK MAHINDRA LTD



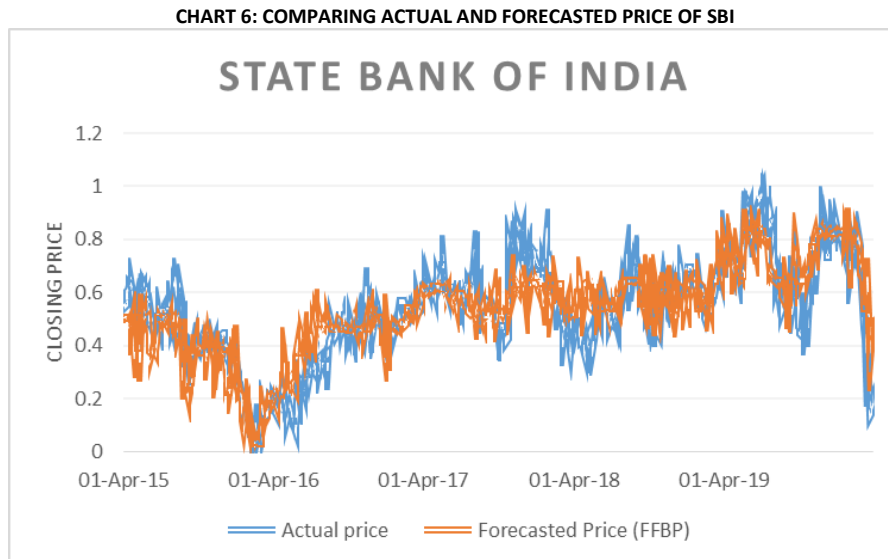
The forecasted values are following a downward or bearish trend. It denotes that the share prices of Kotak Mahindra Bank are falling. In a situation like this it is advised for existing shareholders to sell the shares. Investors can sell the shares and buy them back at a lesser price thus making a capital gain. Investors can also go for short selling, and investors who are not holding shares of Kotak Mahindra Bank are advised to wait and buy later.

- Company: State Bank of India

FIGURE 7: SHOWING NEURAL NETWORK OF PERFORMANCE OF SBI

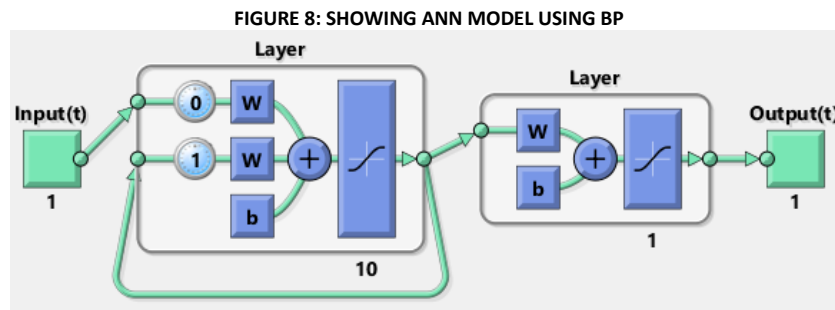


Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted. The graph shows the line of best fit for all the data; it is basically a representation of $y=mx+c$.



The forecasted values indicate a downward trend and it is expected to see an upward trend in the near future. It is observed that the share prices of SBI will rise in coming days. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of SBI are advised to buy them as there is going to be a rise.

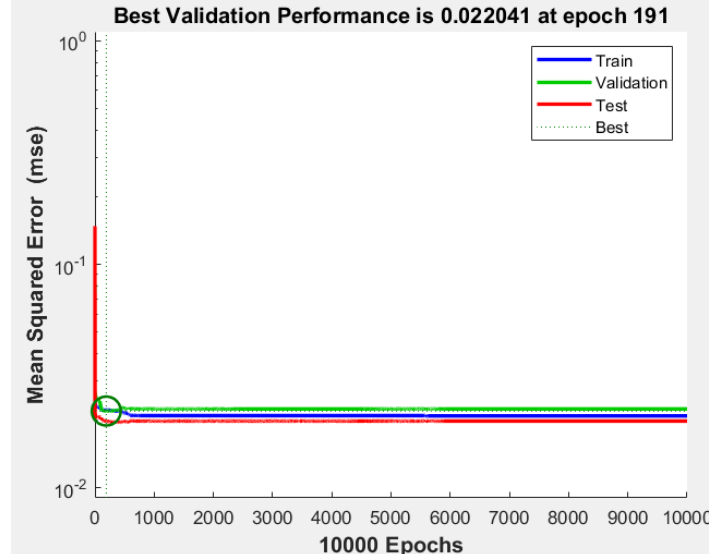
Elman Back Propagation



IT INDUSTRY USING BP

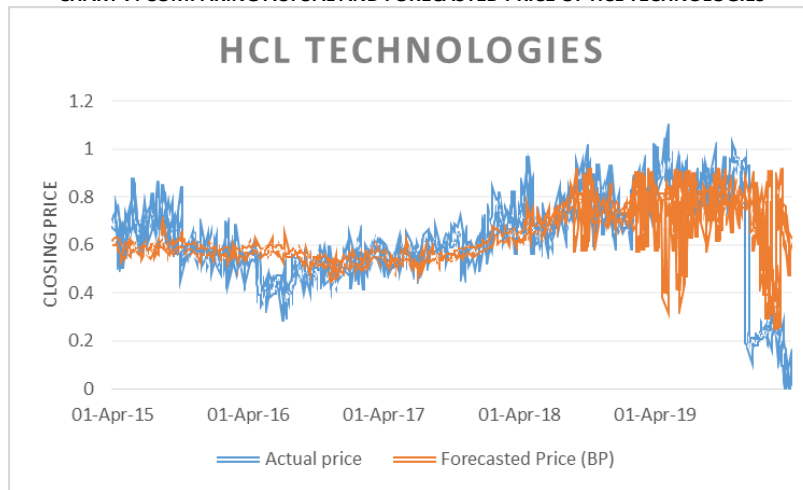
- Company: HCL Technologies

FIGURE 9: SHOWING NEURAL NETWORK OF PERFORMANCE OF HCL TECHNOLOGIES
Best Validation Performance is 0.022041 at epoch 191



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted.

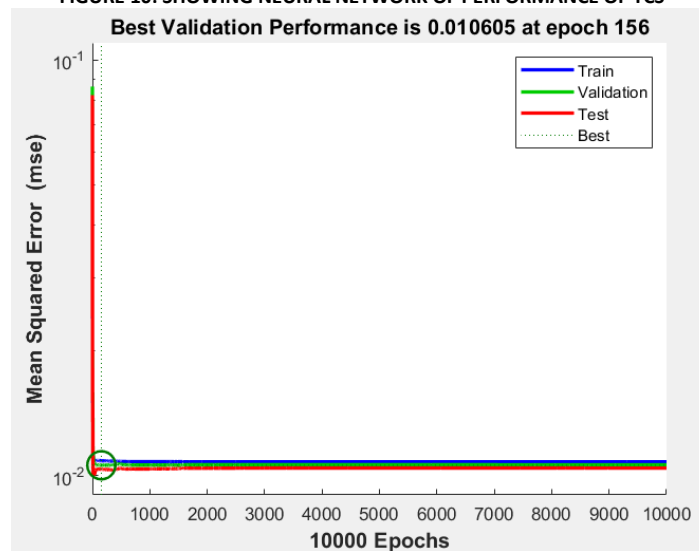
CHART 7: COMPARING ACTUAL AND FORECASTED PRICE OF HCL TECHNOLOGIES



The forecasted values are following a downward or bearish trend. It denotes that the share prices of HCL Technologies are falling. In a situation like this it is advised for existing shareholders to sell the shares. Investors can sell the shares and buy them back at a lesser price thus making a capital gain. Investors can also go for short selling, and investors who are not holding shares of HCL are advised to wait and buy later.

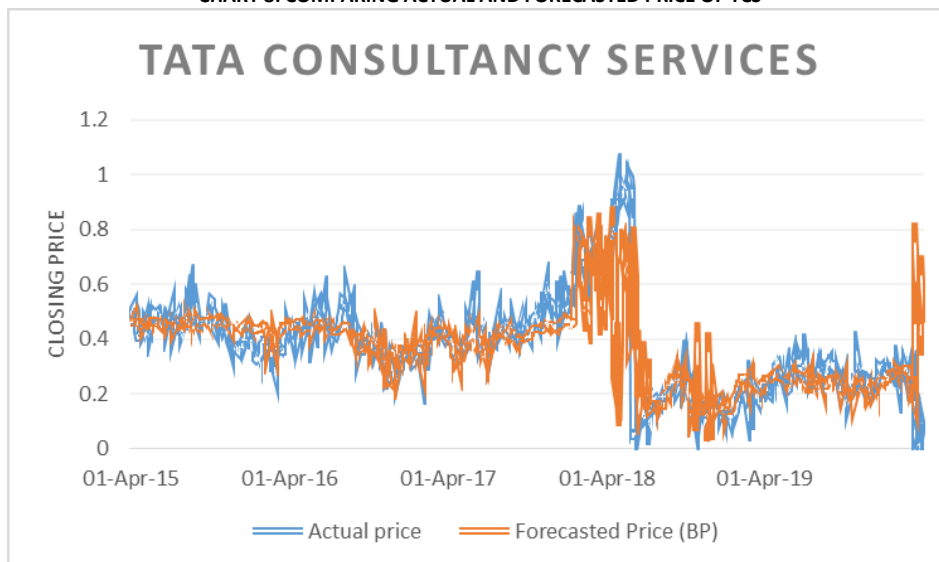
- Company: Tata Consultancy Services (TCS)

FIGURE 10: SHOWING NEURAL NETWORK OF PERFORMANCE OF TCS



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted.

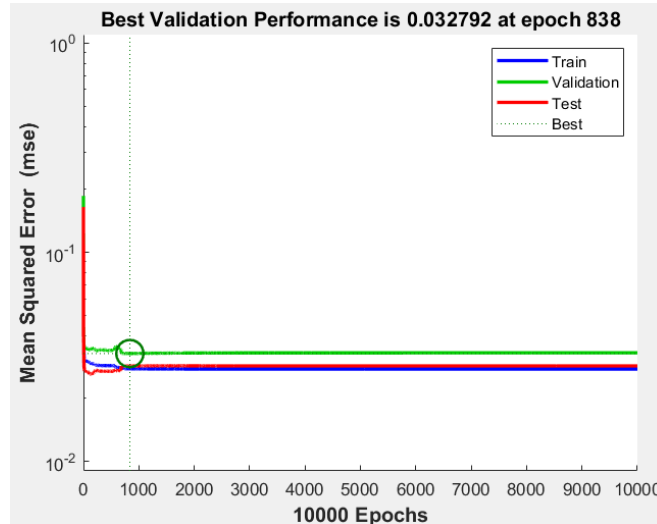
CHART 8: COMPARING ACTUAL AND FORECASTED PRICE OF TCS



The forecasted values show an upward or bullish trend. It denotes that the share prices of TCS are rising. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of TCS are advised to buy them.

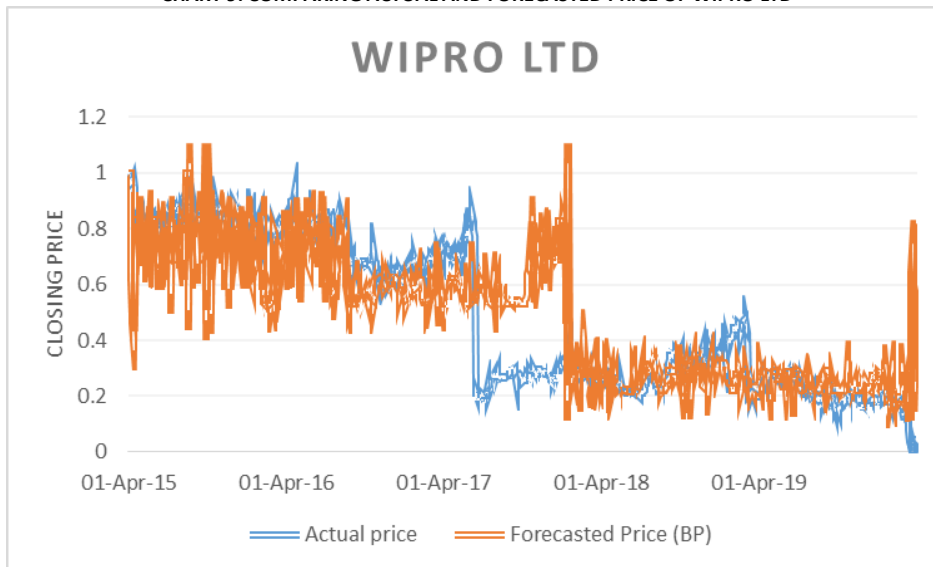
- Company: Wipro Ltd

FIGURE 11: SHOWING NEURAL NETWORK OF PERFORMANCE OF WIPRO LTD



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted.

CHART 9: COMPARING ACTUAL AND FORECASTED PRICE OF WIPRO LTD

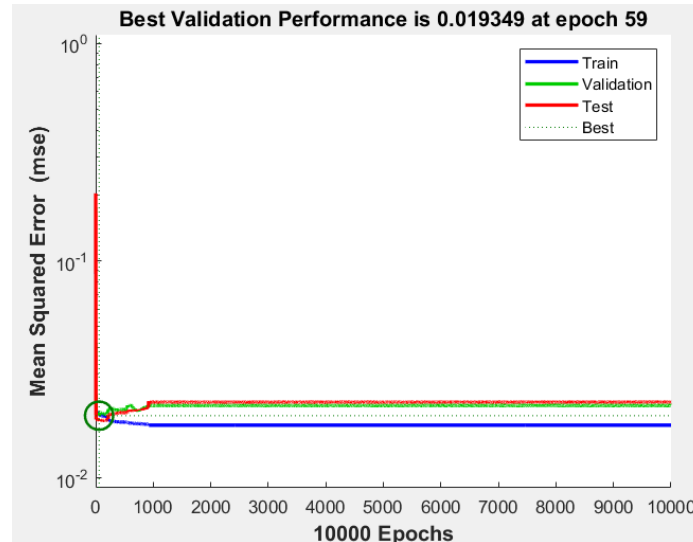


The forecasted values show an upward or bullish trend. It denotes that the share prices of Wipro are rising. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of Wipro are advised to buy them.

BANKING INDUSTRY USING BP

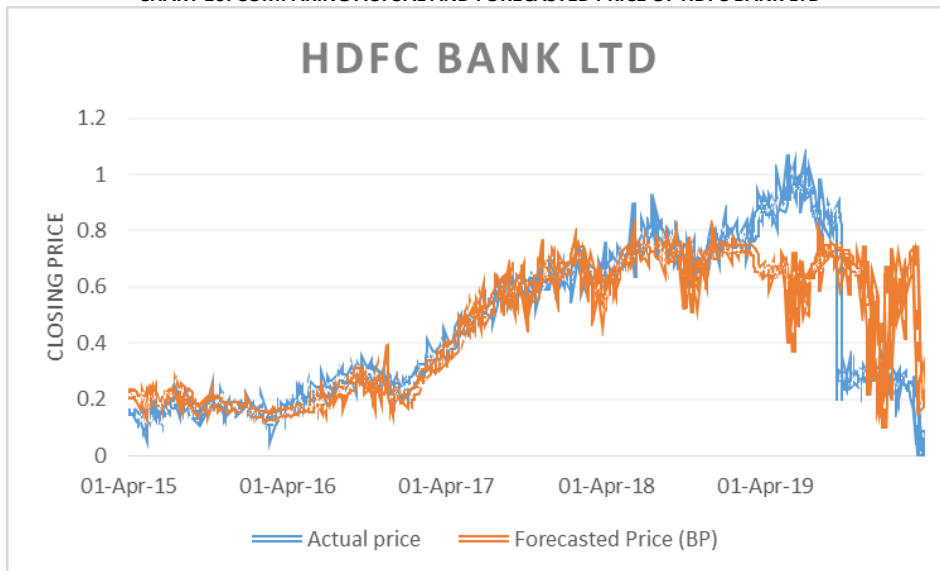
- Company: HDFC Bank Ltd

FIGURE 12: SHOWING NEURAL NETWORK OF PERFORMANCE OF HDFC BANK LTD



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted.

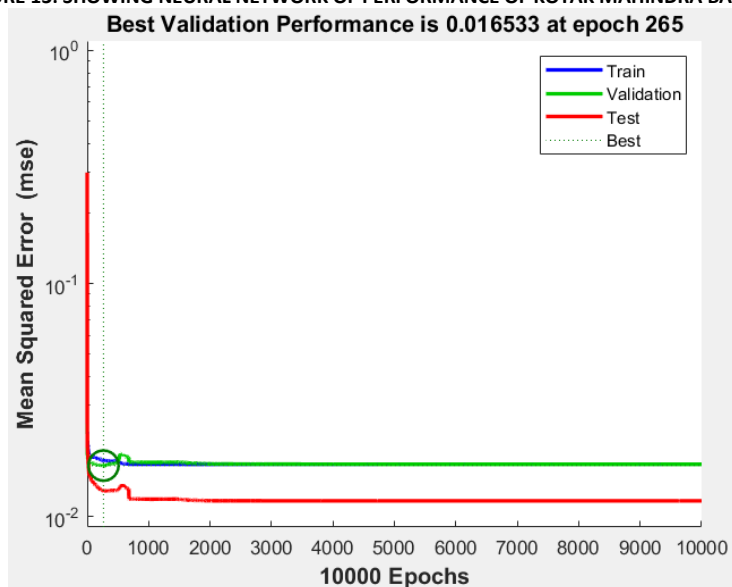
CHART 10: COMPARING ACTUAL AND FORECASTED PRICE OF HDFC BANK LTD



The forecasted values indicate a downward trend and it is expected to see an upward trend in the near future. It is observed that the share prices of HDFC will rise in coming days. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of HDFC are advised to buy them as there is going to be a rise.

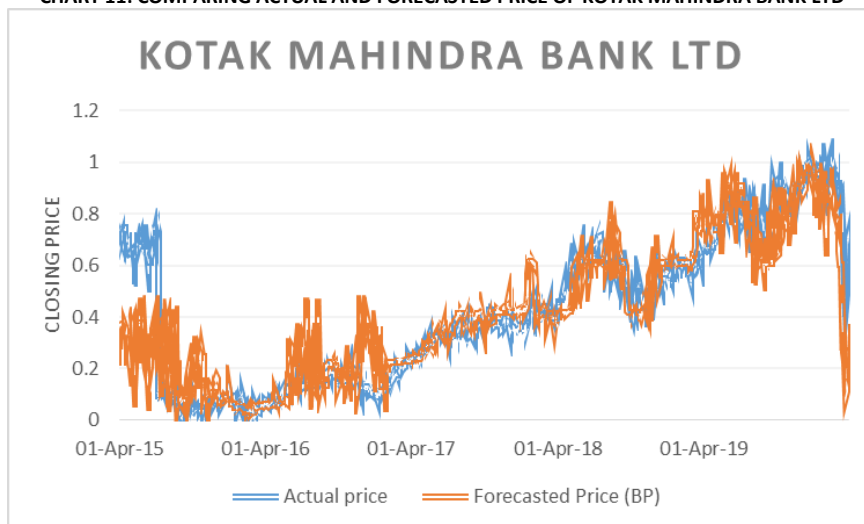
- Company: Kotak Mahindra Bank Ltd.

FIGURE 13: SHOWING NEURAL NETWORK OF PERFORMANCE OF KOTAK MAHINDRA BANK LTD
Best Validation Performance is 0.016533 at epoch 265



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted.

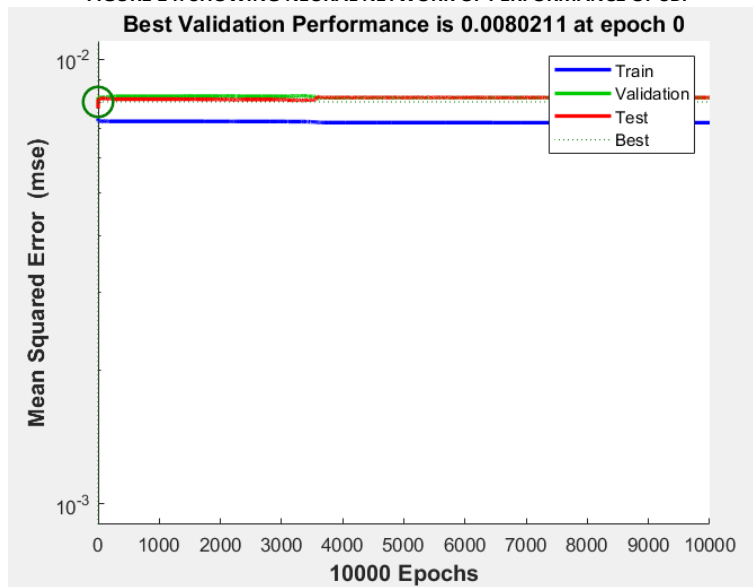
CHART 11: COMPARING ACTUAL AND FORECASTED PRICE OF KOTAK MAHINDRA BANK LTD



The forecasted values are following a downward or bearish trend. It denotes that the share prices of Kotak Mahindra Bank are falling. In a situation like this it is advised for existing shareholders to sell the shares. Investors can sell the shares and buy them back at a lesser price thus making a capital gain. Investors can also go for short selling, and investors who are not holding shares of Kotak Mahindra Bank are advised to wait and buy later.

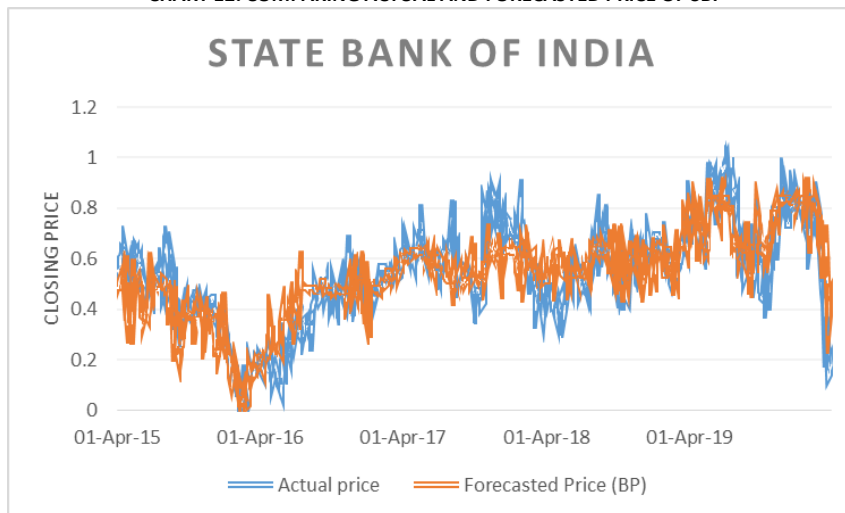
- Company: State Bank of India

FIGURE 14: SHOWING NEURAL NETWORK OF PERFORMANCE OF SBI



Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted.

CHART 12: COMPARING ACTUAL AND FORECASTED PRICE OF SBI



The forecasted values indicate a downward trend and it is expected to see an upward trend in the near future. It is observed that the share prices of SBI will rise in coming days. In a situation like this it is advised for existing shareholders to hold the shares as the values are going to increase more. Investors can sell their shares once it has gone pretty up and make a profit by selling them later. Investors who are not holding shares of SBI are advised to buy them as there is going to be a rise.

TABLE 1: SHOWING SUMMARY OF FORECASTING UNDER FEED-FORWARD AND BACK PROPAGATION

SL. No	COMPANY	Feed-Forward	Back Propagation	Comment
1	HCL Technologies	Sell	Sell	Both the model indicates a fall in price. Therefore, it is advised to Sell the shares.
2	TCS	Buy	Buy	Both the model indicates a rise in price. Therefore, it is advised to Buy and Hold the shares.
3	Wipro Ltd	Buy	Buy	Both the model indicates a rise in price. Therefore, it is advised to Buy and Hold the shares.
4	HDFC Bank	Buy	Buy	Both the model indicates a rise in price. Therefore, it is advised to Buy and Hold the shares.
5	Kotak Mahindra Bank	Sell	Sell	Both the model indicates a fall in price. Therefore, it is advised to Sell the shares.
6	State Bank of India	Buy	Buy	Both the model indicates a rise in price. Therefore, it is advised to Buy and Hold the shares.

TABLE 2: SHOWING COMPARISON OF RMSE BETWEEN FEED-FORWARD AND BACK PROPAGATION

SL. No	COMPANY	Feed-Forward's RMSE	Back Propagation's RMSE	Best Fit
1	HCL Technologies	0.148853373	0.147920975	Back propagation
2	TCS	0.102806343	0.103741823	Feed-Forward
3	Wipro Ltd	0.171483185	0.169177321	Back Propagation
4	HDFC Bank	0.139227756	0.139738916	Feed-Forward
5	Kotak Mahindra Bank	0.129141124	0.128735394	Back Propagation
6	State Bank of India	0.086686053	0.086691778	Feed-Forward
	OVERALL RMSE	0.778197834	0.776006207	

Root Mean Square Error indicates the variance of the residuals. RMSE represents the absolute fit of the model to the data. A smaller RMSE indicates that the model is good at predicting the observed values. Comparing the RMSE obtained under both the methods, it is evident that the Back Propagation's RMSE is lower than the Feed-Forward's proving that Back propagation is a much better fit.

INTERPRETATION

The Feed-Forward neural network has performed on par with Back Propagation neural network to generalize, granting the use of learned models to previously unseen arise. The NN models have been able to accept the out-of-sample information. The produce for the higher performance than Feed-Forward neural network is the Back Propagation neural network. Both the models make use of data from all variables. The Back Propagation neural network model as in comparison with Feed-Forward neural network model has performed better. The iterative quality of the forecasting in the both neural network models helps in obtaining optimal results due to the repetition of computational procedure applied to the result of previous application. The increase in epochs leads to change in weights in the neural network which in turn provides an optimal curve. It helps to optimize the output efficiently and quickly.

In term of errors, the Feed-Forward Neural Network model is on par with the Back Propagation Neural Network model and in terms of performance and generalization Back Propagation neural network model is better than Feed-Forward neural network. Out of the runs performed on various companies and banks, the Neural Network models have provided within the first three runs performed. Unprecedented events such as the pandemic may disrupt the forecasting of various companies and banks. The time performance for Neural Network models are advanced in terms of preventing primarily based exceptional model. The time vs. Generalization alternate-off have become higher for the Neural Network models.

SUMMARY OF FINDINGS

- Stocks of Infosys Ltd, Wipro Ltd, TCS, State Bank of India, ICICI bank and HDFC bank are recommended for "Buy and hold" decision.
- Stocks of HCL Technologies, Tech Mahindra Ltd, Kotak Mahindra Ltd and Axis Bank are recommended for "Sell" decision.
- Back Propagation had the lowest Root Mean Squared Error (RMSE) of 0.776006207 compared to that of Feed-Forward of 0.778197834 for all the stocks put together. Therefore, the best fit model for prediction is the Back Propagation method.

CONCLUSIONS AND SUGGESTIONS

The machine learning techniques used in this study are Artificial Neural Networks, to predict IT sector and Banking sector stock prices. Neural network indicates good capability for use in multivariate forecasting of Stock prices. The Neural Network models used in this study have been a simple feed forward model and Elman Backpropagation model. The ANN model has been trained with historical data. The dataset is subsequently divided into training and test sets for the formation and accuracy testing of the ANN model. Nevertheless, price change forecasts are only guided regularly by the Sectoral Index. The precision reveals that it can be used as a scientific instrument to forecast price path. From the study, we can conclude that ANN models can be consistently successful in predicting price movements compared to other statistical and technical tools. The predicted sectoral stock prices can help investors make smart investment decisions as well as help analysts to predict and study trends in sectoral indices and the model can be further applied to specific stocks.

Advanced models like Recurrent Neural Networks (RNN) and lengthy short-time period memory (LSTM) neural network models can be used in the future. Because statements and views of well-known personalities influence the prices of stocks, such sensor studies may help to achieve a further advantage in the estimation of stock prices. Recurrent Neural network and Lengthy short time period Memory may be more appropriate for time series forecasting due to their capability to recurrently take a look at beyond data points while studying new data points. A network must be retrained on a regular basis for effective and realistic estimation of closing rates and market path. This is important because the market relies on current characteristics. In order to increase accuracy of the neural network, the data fed should be in huge volume.

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IMPACT OF COVID-19 ON MEDIA AND ENTERTAINMENT INDUSTRY

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ABSTRACT

COVID-19 had an impact on every section of society in one or the other way. The Reserve bank of India (RBI) has predicted a negative economic growth rate for the economy. Government has imposed complete lockdown of more than two and half months to limit the outbreak of the lethal virus that had drastic and adverse effect on the manufacturing as well as the service sector. COVID-19 has effected multiple segments of the Media and Entertainment industry in different manner. Some of the segments have faced adverse effect whereas few others have flourish. The media and Entertainment industry is assumed to be one of the highest growing industries in the Indian economy. So in this paper, an attempt has been made by the authors to study the impact of the contagious Covid-19 on the different segments of Indian Media and Entertainment industry.

KEYWORDS

COVID-19, media and entertainment industry, advertising, market, communication tools.

JEL CODE

L82

INTRODUCTION

Entertainment is as necessary as food and shelter for all of us. When we all were packed inside our houses to protect ourselves from the outburst of the contagious Covid-19, then some sort of entertainment is needed to pass the time. All sorts of outdoor entertainment medium were closed and only indoor entertainment medium were easily accessible which include TV, Radio, Newspapers, OTT platforms, etc.

The Media and entertainment industry was both positively and negatively affected by Covid-19. Sectors like out of home entertainment which includes a movie theatre, theme parks, and sports centres, etc. have a negative impact whereas sector like OTT platforms and few TV platforms were positively affected.

REVIEW OF LITERATURE

As per KPMG (2020) traditional media could face some crises but digital media businesses have fared relatively better, although only on the consumption side. Shekhar (2020) has thrown light on all the issues media and entertainment industry is facing after COVID-19 hit the world.

PTI (2020) reported in the 'The Hindu' articles that the Indian Newspaper Society (INS) has urged the government to grant a compensation package for the newspaper industry to overcome the unprecedented loss they faced due to noble coronavirus.

Jha (2020) in her article has stated that there is a 20% of growth of subscribers for the OTT platform.

Omnicom Media Group (2020) has presented in their report about the consumer preferences towards TV, OTT platforms and social media.

PWC (2020) in their report has listed various issues media and entertainment industry is facing in the present situation of COVID and have suggested necessary step to overcome this situation.

OBJECTIVES OF THE STUDY

1. Impact of COVID 19 on different segments of entertainment media.
2. Issues faced by the entertainment and media industry.

RESEARCH METHODOLOGY

This study is based on secondary data. Data related to research purpose is collected from various online newspapers and periodic reports on media and entertainment industry published by different institutions like KPMG, BARC India, Omnicom Media group, etc.

DATA ANALYSIS AND INTERPRETATION**1. Impact of COVID-19 on different segments of entertainment media:****a) Television**

When people were caged in their houses due to COVID, Television was a vital source of information and entertainment. Television has been a part of everyone's life from time immemorial. As per KPMG report (2020), TV viewership has increased but fresh content was missing due to lockdown. During COVID times News Channels have gained popularity. As per Business Today report (10 April, 2020) BARC India has stated that Doordarshan became the highest-watched channel in India, due to two of the most popular shows in Indian history -- Ramayana and Mahabharata. Doordarshan has increased its TRP (Television Rating Point) by running all classic serials like Shaktimaan, Buniyaad, etc on its channels in the lockdown.

TABLE 1

Particulars	Pre-COVID	During Lockdown
Weekly viewing minutes(billion minutes)	887	1215
Average daily reach(million)	560	622
Number of channels watched	16	22
Daily average time spent per viewer(hours : minutes)	3:4	4:39

Pre-COVID-19 period is Jan 11-31; Lockdown week is March 21-27

Source: BARC, Neilson (Bloomberg Quint)

b) Cinema

As per ET (2020), trade analysts and big producers have predicted a loss of Rs. 200-250 crore due to delay in the release of films or shooting in under-production films. Movies like Brahmastra, starring Ranbir Kapoor and Alia Bhatt, Shahid Kapoor’s Jersey suspended their shootings in between due to the sudden fall of the pandemic. Rohit Shetty’s Sooryavanshi which was all set to release on March 24, delayed its release date due to a sudden lockdown of 21 days, announced by PM Narendra Modi from midnight of 24 March. Other movies like Sir, 83, Sandeep and pinky faraar and haathi meri saathi also got delayed. Movies like Angrezi Medium, Laxmii, Dil Bechara, Gulabo Sitabo, Shakuntala Devi, Gunjan Saxena, Sadak 2, Ludo, KhaaliPeeli, Khuda Hafiz, Lootcase, Durgamati, and Coolie no. 1 were released on the OTT platform.

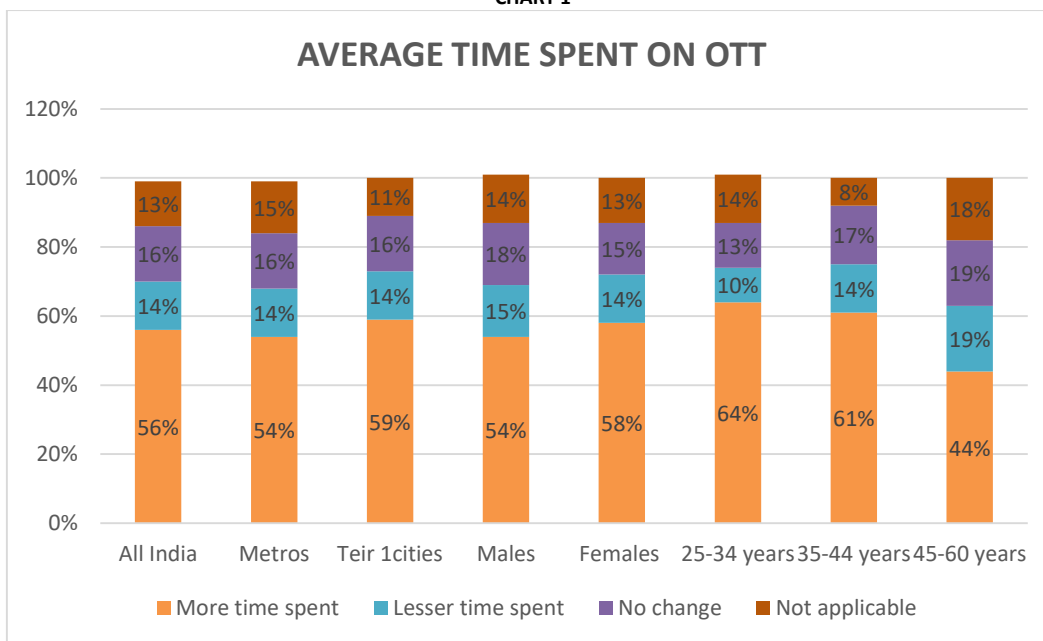
c) Print media

Print media is the fourth pillar of democracy which is well known for providing factual information is also negative impact due to this epidemic. As per the report of The Hindu (2020) which states that the Indian Newspaper Society (INS) has reported a loss of 12,500 crores in the last eight months and an annual loss of ₹ 16000 crores for the newspaper industry. Further, it has asserted that both advertising and circulation have been seriously affected by the COVID-19 pandemic. Many of the publication houses have either shut down or suspended some of their editions.

d) Over the top (OTT) platform

When everyone was forced to stay inside their houses, OTT platforms were the most convenient medium of entertainment. OTT has bloomed to its highest peak during the lockdown period. As per LIVEMINT report (2020), there is an outstanding growth of 60-70% for OTT subscribers since May 2020. Thereafter it was witnessed around 20% per month. Earlier there was a quick rise in the number of subscribers but later the growth has slowdown. Like Netflix has reported 2.2 million net additions in Q3 versus 10.1 million globally in Q2. OMG Omnicom Media Group (2020) stated that the average time spent on OTT platforms was 95 minutes on daily basis.

CHART 1



Source: Omnicom Media Group (2020)

e) Radio

The disastrous pandemic of 2020 has a positive impact on radio listenership. As per Deccan herald report, the Association of Radio Operators for India (AROI) has conducted a study that states that there are 51 million radio listeners. The study further states that there is a 22% increase in radio listenership from 64% to 86%. During COVID times radio has been one of the reliable mediums for information. Radio has a second credibility score of 6.27 after the Internet which is at 6.44.

f) Live events

Due to sudden outbreak of lethal coronavirus which was originated from China’s Wuhan has affected various live events which were scheduled to be organized worldwide. List of live events which got canceled in India due to lockdown:

- IIFA Awards,
- Indian Fashion Week,
- AWS (Amazon Web Services) summit 2020,
- India Fintech Festival (IFF 2020)

Either the live events got canceled or delayed due to the outspread of deadly coronavirus which has resulted in millions of dollars lost to the event industry.

2. Issues faced by the media and entertainment industry

- a) Social distance guidelines are the big obstacles for live events nationwide at stadiums, arenas, theatres, resorts, theme parks, and other venues which cause loss to the entertainment and media industry. As per the business standard report (2020) India’s exhibition sector has lost an estimated ₹ 3,570 crores due to the lockdown imposed across the country to curb the spread of the COVID-19 pandemic.
- b) Delays in film and television production due to halt in the shooting because of pandemic and its guidelines
- c) Only important business activities were permitted by the government, which also resulted in the loss of the Media & Entertainment Industry.
- d) Print Media suffered a loss due to fear of infection in public. The Indian Printer & Publisher (2020) reported that as per Ad factors the Indian newspaper industry expected to lose ₹ 4000- 5000 crores in just March and April due to sudden lockdown. And also their annual revenue is expected to decrease by 16% in FY 2020-21.
- e) Electronic media especially television have to make huge adjustments in the advertisement time slots which are normally booked in advance.

- f) As per the financial times report (2020), Advertisement revenue has suffered a loss due to COVID as many major airlines, travel and tourism brands, electronic goods, real estate companies have canceled television commercials and few of them are re-evaluating their advertisement spends.
- g) OTT platform was the most preferred medium of entertainment during COVID times; content that is aired through OTT was advertisement-free. This also causes a loss in revenue generated from the advertisement. Overall advertisement revenue growth and decline in the FY 21 on various mediums.

TABLE 2

Segment	Advertising revenues (INR billion)		FY21 Growth / Decline
	FY20	FY21	
Digital and OTT	199	223	12%Growth
TV	262	217	17% Decline
Print	198	107	46% Decline
Films	11	4	65% Decline
Out of Home	31	16	49% Decline
Radio	25	12	50% Decline
Total	726	579	20% Decline

Source: KPMG in India analysis 2020(Campaign India)

CONCLUSION

The contagious COVID-19 has a positive as well as a negative impact on different entertainment sectors. On the one side sectors like print media, cinema (especially movie theatres), out of home entertainment have faced adverse effects due to fatal disease but on the other hand OTT platforms, television have got positive impact. Advertisement revenue which is a major earning for the entertainment industry is heavily affected due to COVID; only revenue from OTT advertisement had an upward graph.

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EFFECT OF ADVERTISEMENT AND DIRECT DISPLAY OF PRODUCTS IN MALL ON PURCHASE BEHAVIOUR OF CONSUMERS

(WITH SPECIAL REFERENCE TO BHILAI CITY, CHHATTISGARH)

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HUDCO, BHILAI

ABSTRACT

Consumer is a Master of Market. The whole activity of Market revolves around only on this center point. Hence, no vendor would get successful without a study on purchase related activities of a consumer. The present research has been done to study the effect of advertisements and direct display of products on consumer's purchase behaviors. This study was done in a mall to know the effects of advertisement at purchase zones.

KEYWORDS

consumer, consumer buying behavior, point of purchase, advertisement.

JEL CODES

M31, M37.

INTRODUCTION

Today's era is an era of competition; every producer or merchant seeks to attract consumer's concern towards his product by any means. For this purpose, he uses various techniques like advertisement Ad is used as the biggest weapon for this.

The consumer is easily attracted at the very moment if proper and well-presented ad is shown to them at stores or malls. He gets convinced and is forced to buy the product after seeing ad.

Present study is aimed to fetch information about consumer's interests regarding this subject.

OBJECTIVES

1. To study that advertising contents displayed in malls encourages consumers to buy good.
2. To study that advertisements alone in malls and special displaying techniques provoke consumers to purchase exceeding his budget.
3. To study the mental satisfaction level of consumers.

HYPOTHESIS

H0- Advertising and special displays in Mall does not encourage consumers to buy those goods for which advertising has been done.

H1- Advertising and special displays definitely encourages the consumers to buy that goods in which advertising has been done.

H0-Advertising in Malls and special displays techniques does not provoke consumers to purchase exceeding their budget.

H1- Advertising in Malls and special displays techniques definitely provokes consumers to purchase exceeding his budget.

SCOPE OF STUDY

The Inferences of study are based on the responses received by the consumers at Surya Mall Bhilai. This study will be helpful getting an insight into the perception of consumers interests on purchase by advertisements.

RESEARCH METHODOLOGY

The study is based on primary and secondary data. The primary data was collected through structured questionnaire for which samples of 50 respondents were selected.

The collected data was analyzed with a statistical tool like percentage.

AREA OF STUDY

The respondents were randomly selected at SURYA MALL, BHILAI for the study.

SAMPLE SIZE

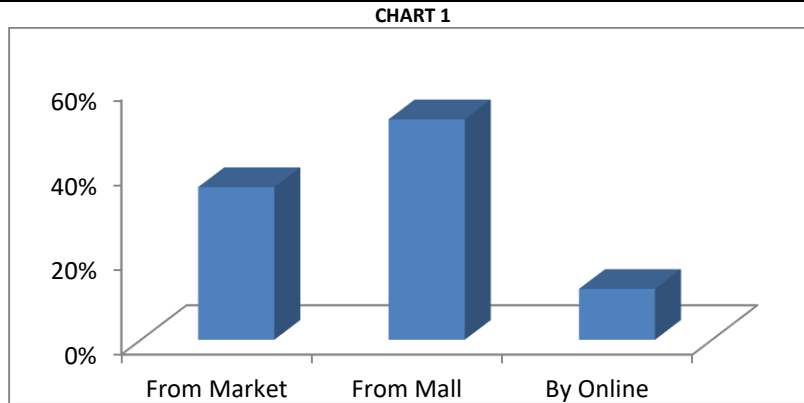
The sample size taken for the study is 50 respondents.

DATA ANALYSIS

Q.1 Your preference place to purchase items.

TABLE 1

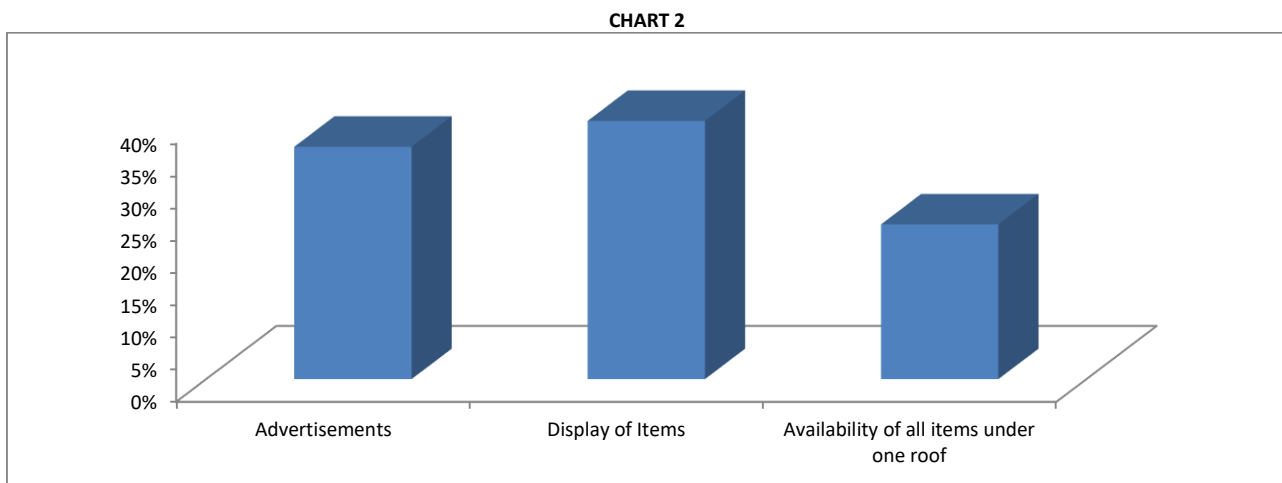
Options	Response	%
From Market	18	36 %
From Mall	26	52 %
By Online	06	12 %
TOTAL	50	



52% consumers prefer Mall as a place to purchase items 36% from Market and 12% Online
Q.2 you get impressed with which components in mall to purchase items.

TABLE 2

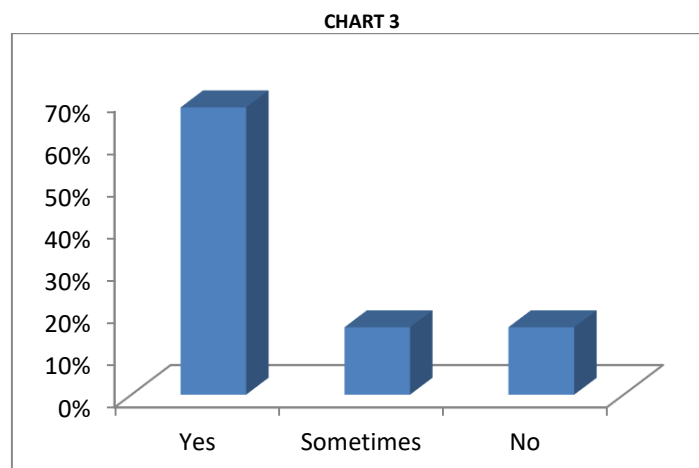
Options	Response	%
Advertisements	18	36 %
Display of Items	20	40 %
Availability of all items under one roof	12	24 %
TOTAL	50	



Display of Items impress 40% consumers in mall to purchase items, 36% are impressed by Advertisement and 24% by availability of all items under one roof.
Q.3 Does advertising materials inside malls influence you to purchase by exceeding your budget.

TABLE 3

Options	Response	%
Yes	34	68%
Sometimes	08	16 %
No	08	16 %
TOTAL	50	



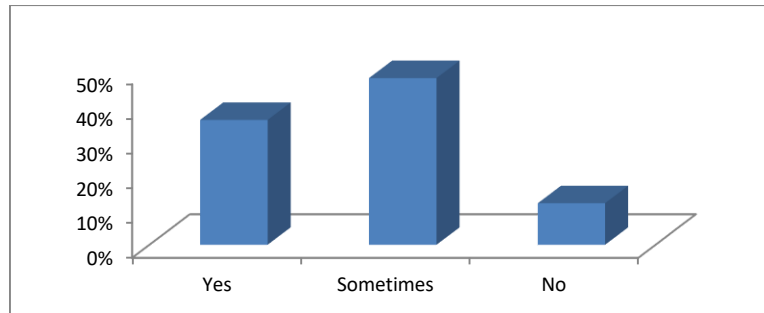
68% consumers believe that on going to mall gets influenced by advertisement to buy it exceeding their budget. 16% said No and remaining 16% are influenced sometimes.

Q.4 Does an effective advertisement done for specific brand encourages you to buy that new brand instead of your old brand?

TABLE 4

Options	Response	%
Yes	18	36 %
Sometimes	24	48 %
No	06	12 %
TOTAL	50	

CHART 4



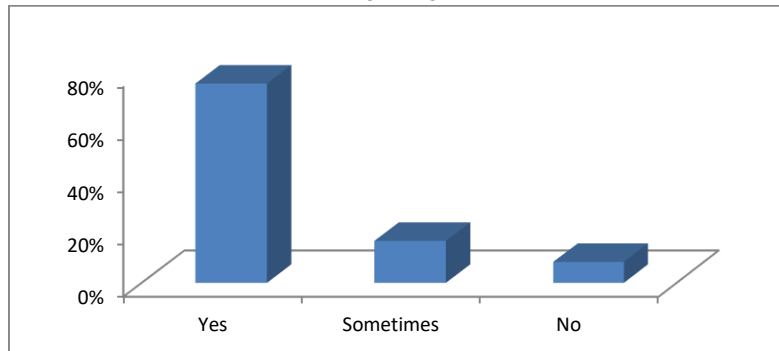
36% consumers believe that if any brand is specifically advertised it encourages them to buy new brand instead of their regular old brand. 48% consumers sometimes buy the new brand the remaining 12% do not have any effect.

Q.5 Does a systematic display of items in mall encourages you to buy those products which you have not planned to buy earlier?

TABLE 5

Options	Response	%
Yes	38	76 %
Sometimes	08	16 %
No	04	08 %
TOTAL	50	

CHART 5



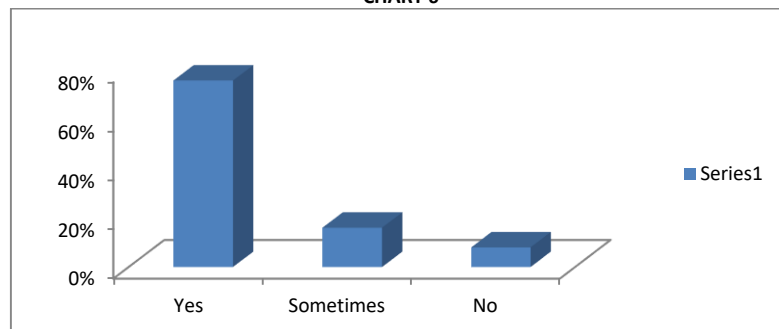
76% consumers believe that when the products are systematically displayed in malls it encourages them to buy in an unplanned order. Where 16% of them are influenced sometimes and the last 8% are not at all influenced.

Q.6 Does attractive gifts and offers provided in malls increases your purchase?

TABLE 6

Options	Response	%
Yes	38	76 %
Sometimes	08	16 %
No	04	08 %
TOTAL	50	

CHART 6



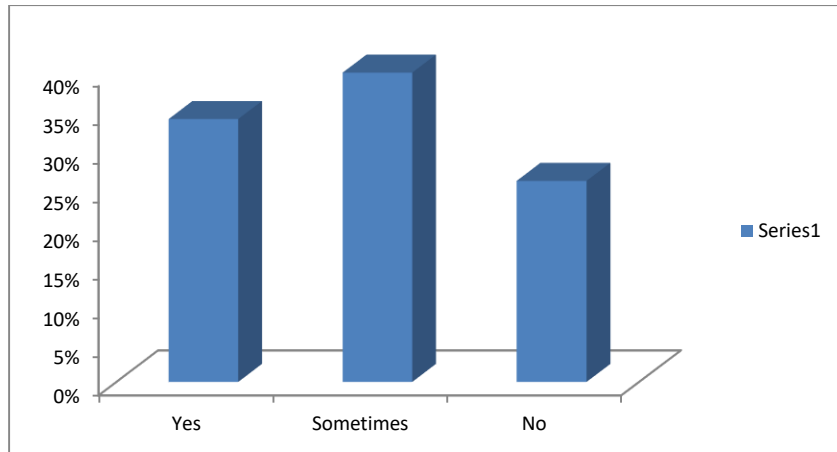
As per the responses 76% consumers believe that attractive offers provided in malls increases their purchase. 16% said sometimes and the remaining 8% did not respond to such offers.

Q.7 Do you like to buy items from mall even after knowing the facts that advertisements done at shopping malls increases the price of items?

TABLE 7

Options	Response	%
Yes	17	34 %
Sometimes	20	40 %
No	13	26 %
TOTAL	50	

CHART 7



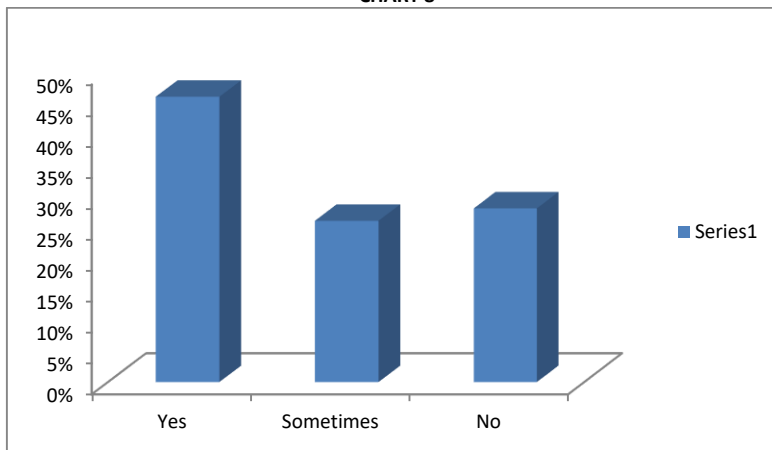
34% Consumers like to buy items from mall despite of knowing the fact that the prices are higher due to advertisements in the mall. 40% consumers do so sometimes and the remaining 26% do not shop from malls.

Q.8 Does shopping from mall gives you satisfaction that you have got complete payback of spent money?

TABLE 8

Options	Response	%
Yes	23	46 %
Sometimes	13	26 %
No	14	28 %
TOTAL	50	

CHART 8



46% consumers believe that shopping from mall gives them satisfaction that they have got complete payback of spent money. 26% consumers feel so sometimes and the last 28% are not satisfied at all.

HYPOTHESIS TESTING

- 68% respondents said that advertising contents and display in Mall encourages them to buy that products to which advertising has been made. H1 is significant that Advertising and special displays definitely encourages the consumers to buy those goods for which advertising has been done.
- 76% respondents said that they purchase more than their budget in Malls due to advertisement and special displaying techniques applied in the mall. H1 is significant that Advertising in Malls and special displays techniques definitely provoke consumers to purchase exceeding his budget.
- 46% Consumers are satisfied with shopping in Malls instead from market.

FINDINGS

- Data collected from questionnaire gives an information that today's consumers prefers malls for shopping instead of market.
- Consumers get highly influenced by advertisements exhibited in malls.
- A systematic advertisement at shopping zones can replace old brands with new ones and can also increase the selling of new items.
- Consumer get attracted towards new items by their systematic and direct exhibition and buys more than the requirement.
- The increased price of goods due to advertisement at shopping places do not reduce the number of consumers.
- According to most of the consumers in shopping malls they care for the satisfaction of consumers.

LIMITATIONS

1. This study is limited to only on the consumers of a particular mall.
2. Respondents selected is 50 only.
3. The selection of respondents was selected randomly and not on the basis of age, income and education.

SUGGESTIONS

1. Extra expenses should not be done on advertisements as it increases the price of products.
2. Simple language should be used for advertisement so that it could be understood by the common consumers.

CONCLUSION

Now a days people in India, like Western Countries are showing greater interest towards malls and shopping centres. In the capital of Chhattisgarh Raipur there are 15-20 mall and shopping centres approx as compared to Durg- Bhilai still has lesses number of mall & shopping centres in which Surya Treasure Island Mall, shr Shivam, SB Bazar, Zee Market are most prominent.

Young consumers of Durg and Bhilai also like the trend of purchasing from Malls & shopping centres. Consumers rely more on advertisements for purchasing products.

Consumers get inspired by the advertisement of a particular product provided by a seller during their last moments of purchase and are encouraged to buy that particular product.

Thus it clearly states that, the advertisements provided at the point of purchase encourages the consumers to buy more.

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A STUDY ON THE ACCURACY OF ALTMAN Z SCORE MODEL IN PREDICTING BANKRUPTCY OF LISTED INDIAN COMPANIES

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ABSTRACT

Predicting bankruptcy is not a fresh concept in the present world scenario. In the past, there have been a lot of studies made on different models which are applied in predicting corporate insolvency. Over the years, various models have evolved that could predict insolvency from the company financial data. Because of this, certain models such as Altman Z score has obtained a reputation for being comprehensive models of bankruptcy prediction. However, in the Indian context, not many studies are conducted in this field. The purpose of this research revolves around testing the accuracy of Altman Z Score Model when applied on listed Indian companies and also drawing a comparison between the solvent companies and the insolvent companies. The objective of the study involves evaluating if financial information of a company is sufficient to predict any forthcoming bankruptcy and also to check the accuracy and predictive ability of the model on the given sample. Furthermore, this research also challenges the traditional theory of Dr. Edward Altman, which says that Z score can predict Bankruptcy two years prior to its occurrence. The data analysis proves the hypothesis that Altman Z score model can predict bankruptcy as far as 5 years before its occurrence. Precisely, companies from Auto ancillary industry, Infrastructure industry, Construction industry, Pharma, and textile industry form the stratified sample. The population under consideration includes the companies which are under insolvency proceedings of IBC from the year 2014 to 2020 and an equivalent sample of solvent companies is considered for ensuing uniformity in number. The importance of the research can be justified by looking at several instances of bankruptcy in the recent past that has put a lot of pressure on the Indian financial system. This paper reflects the importance of Altman Z score as a predictive model and how it can affect the decisions of various stakeholders.

KEYWORDS

IBC, bankruptcy prediction, financial modelling, altman Z score, insolvency.

JEL CODE

G33

1. INTRODUCTION

Banking in India has gone through several hiccups and quite recently, a lot of banks particularly the public sector banks have faced lot of criticism in terms of its credit evaluation techniques. In the recent couple of years many of the large corporate entities have been declared bankrupt and are under bankruptcy proceedings. Companies like Videocon Ltd, Electrosteel Ltd, Bhushan Steels Ltd, Punj Loyd and many affluent companies went bankrupt during the past two to three years. Such repeated accounts of bankruptcies are not a good sign from the economic perspective. When there are huge quantities of bankruptcies, at that point purchasers and organizations start getting increasingly cognizant about loaning and spending too far in the red, which could smother the economy. On a longer term perspective corporate bankruptcies will tremendously affect the entire economy and will put it into a distress. Evidence of this can be obtained from the 2008 crisis, where large investment banks kept on distributing credit in unconditional terms and finally led to the fall. However, the real cause of bankruptcies may not be improper credit evaluation. Internal politics, biased approvals also can be accounted as a factor affecting the bankruptcies. In this context it is very important that the issue of bankruptcy is addressed at the earliest and there must be a mechanism to identify any potential bankruptcies before the bank or any other stakeholder gets affected by it. The process of identifying potential bankruptcies has already begun with the advent of technologies like core banking solutions and KYC norms. But this is largely limited to the retail banking. Global Investment banks like Morgan Stanley, JP Morgan have initiated several risk management approaches to identify defaulters in their portfolio.

2. REVIEW OF LITERATURE

Pritesh S. and Vivek D. (2020) bring to light that the economy relies on the performance of many sectors such as manufacturing, services, real estate, power etc which drives the growth of the economy. Hence each sectors' financial soundness is very important because investors prefer the stable market places to invest and in turn represent the stable economy. One of the major sectors which mirror the economy is the power sector. This research focuses on analyzing the financially distressed power generation/distribution organizations of India and also aim to find the financial issues associated with the sector during the year 2018 and 2019 from financial reports of selected companies. In this study the Altman Z-score model is applied to assess the sample of ten power sector firms/organizations of India. The results show that all sample companies are distressed and require immediate policy changes and healthy capital structure to reduce the distress. The management of companies and Indian government can come together and form policies to uplift the performance of power sector.

Sailesh Andrade, Vatsal Bhandari (2020), This article throws light on how Altman Z score and its components could have predicted the distressed Indian Companies like reliance telecom, cox and kings Jet Airways, Videocon, It begins with the evolution of this model and how it has been improvised over the years, It then speaks about the components of the Altman Z score model and the weights attached to it. And finally concludes with the calculation of the Z Scores and their comparison with the standards to find out the degree of stress or the probability of a company to go bankrupt in the forthcoming years. However, this article does not throw light on the different weights given to companies belonging to different industries.

R. Kogila and G. Vasanthi (2019) The steel industry is one of the key industries in India. The success of any business is based on efficient financial management. The study has been undertaken to analyze the financial position of selected steel companies in India. The researcher selected the top five steel companies in India for analyzing financial performance during ten years of the study period from 2007-08 to 2016-17. The researcher applied the Altman Z-Score model for analysis using ratio analysis. The study found that financial performance of SAIL and JINDAL was good during the first half of the study period but it was not so during the second half. Financial performance of Tata Steels was good during 2007-08, 2009-10 and 2010-11 and during other years it was not so. Financial performance as measured by Altman Z-score of JSW was good during the first year of the study period and it was not good during the rest of the years. Financial performance of JSL was not good during the entire period of study as shown by the results of the Altman Z-score model.

Ahmed et al (2018) In the paper the first conclusion of the study is that the Altman-Z scores cut-off range $1.81 < Z < 2.99$ should be updated regularly instead of being used as a fixed range. This is especially true since the Z score of market index for Canada is a dynamic variable and the numerators and denominators of the equation do not move in the same proportion from one year to the next. This results in the prevalent Z-scores (which is in fact a very small range) to move much higher than the cut-off ranges. This phenomenon in-turn could render the model useless in its predictability usage. Hence, extreme care must be exercised when assessing firm health on this metric and performance measurement must be relative to the levels persistent in the market at the time of assessment.

R. Pradhan (2014) From traditional times the Z score values have been constantly used for prediction of Bankruptcy. This has been vital to both the lenders and investors whose returns are based on solvency estimates. The terms of credit have gone a U turn from the traditional times to the modern scenario today. The basic concern of prediction is to evaluate the terms of credit and ensure repayment safely. Z score has been used as a tool to evaluate the credibility of the firms. This paper provides the Z score value for the public sector banks. This value is useful when these banks demand loans from the RBI or any other funding agency. The usage of back propagation neural network is to forecast the internal parameters of Z score and then use these internal parameters to forecast the Z score value up to 2020. Thus the paper emphasizes the usage of BPNN for prediction of bankruptcy for public sector banks in India.

S. Ray (2011) This paper attempts to investigate the financial health of automobile industry in India and test whether Altman's Z score model can foresee correctly the corporate financial distress of the automobile industry in Indian context for the study period, 2003-04 to 2009-10. Present analysis reveals that automobile industry under our study was just on the range of intermediate zone. In our study, Z values for all the seven years were more than 1.81 but less than 3 (Z score= In between 1.81 and 3.0= Indeterminate). It is an alarming matter that Z score value is gradually declining since 2007-08 after global recession hits Indian economy in general and automobile industry in particular. This indicates that overall financial performance of automobile sector in India is at present viable as Z score indicates but may lead to corporate bankruptcy in near future unless regulatory measures are undertaken immediately.

B. Nayak, Nahak C. (2011) The paper analyzes the performance of public sector banks in India during the post-liberalization period. There has been a significant improvement in the performance of public sector banks after reform measures. The paper has used various accounting ratios pertaining to profitability, financial efficiency, operational efficiency and financial soundness to build performance index for banks. Principal Component Analysis method has been used to construct index and rank performance of banks over the last 10 years. Twenty-two parameters pertaining to operational and financial efficiency of banks have been considered to construct the performance index for public sector banks. Altman Z-Score of solvency analysis has been applied to banking sector with suitable financial, operational and other efficiency ratios. It is found that reform measures have impacted positively in enhancing the stability and soundness of the public sector banks in India. The analysis has found that State Bank of India continues to be the number one bank in India and there is competition between Punjab National Bank, Canara Bank, Bank of India and Bank of Baroda for the number two place in different years.

3. STATEMENT OF PROBLEM

Every enterprise big or small, is prone to Risk. Risk Management in itself is a much diversified area. The most crucial part of Risk management in any enterprise is the risk of 'going concern' concept. How does a firm ensure that it is keeping up with the emerging trends, constant competition, changing demands of the clients and customers and at the same time making enough profits or sales and meeting its current obligations so that the company doesn't shut down? There are various tools and techniques to ensure that the company doesn't shut down or goes bankrupt. The most effective of them is the Altman Z Score Model.

In this research, Indian listed companies which filed for bankruptcies during April 2017- March 2020 are classified based on the industry they belong to, a sample from each industry is taken and Industry specific ALTMAN Z score formula is applied on the last 5 years financials of such companies using Financial Modeling. The trend in the Z scores is interpreted. These scores are compared with the Z scores of the last 5 years of the solvent companies belonging to the same strata. Such a multi-industry research has never been performed on the Indian Listed Companies to test the accuracy of the globally recognized and critically acclaimed ALTMAN Z score model.

4. OBJECTIVES OF THE STUDY

1. To identify and analyze the reaction of the Z score to the financials of companies belonging to different sectors and industries.
2. To analyze the Bankruptcy predictive ability of the ALTMAN Z score model.
3. To evaluate the trend of the Z Scores of the last 5 years of each company which filed for bankruptcy.
4. To compare the Z score of the companies with sound financial health with the Z Scores of the companies which have filed for bankruptcy during April 2017- March 2020.

5. HYPOTHESIS OF THE STUDY

H1- Financial performance cannot predict a company to be bankrupt prior to two years.

H2- There is no relation between the Z score and the date of filing of bankruptcy

H3- The trends in the Z scores do not predict/indicate bankruptcy

H4- Altman Z score is not an accurate model to predict bankruptcy

6. RESEARCH METHODOLOGY

The study undertakes 5 years financial data (from the date of filing bankruptcy) of 10 bankrupt companies from 5 industries namely auto ancillary, infrastructure, electronics, construction, pharma and textile and analyses their Z scores and compares them with the data of solvent companies corresponding to the industries they belong to.

List of 4 hypotheses are identified based on the objectives of the study. Financial data are analysed using MS Excel, Descriptive Statistics, Real Stats, Shapiro-Wilk test, and VBA Charts and Figures to prove the acceptance of Null/Alternate Hypothesis. The study is based on secondary data readily available in the respective company websites. 5 years financial data have been considered and analysed for the study. It involves purely quantitative study.

7. LIMITATIONS OF THE STUDY

It is not possible to conduct a research without any limitation, listed below are some limitations of this research.

1. This research mostly concentrates on a smaller sample of 10 bankrupt companies which represents around 8% of the total population size.
2. Further the sample holds a bias towards the industries chosen and the companies chosen as samples which may not justify the situation of bankruptcy in the economy.
3. The research is conducted based on the assumption that the risk of bankruptcy can only be influenced by the financials of the companies. There are other factors that may affect the risk of bankruptcy in the future which can be both macro and micro.
4. Further the sample selected in for the "solvent" companies do not follow any standard category like any index. It is quite random.

The period of bankruptcy is considered to be 3 years. However, the year ending of assumed to be 31st of March and all the bankrupt companies are considered as bankrupt on that day if depending on the year of bankruptcy. For example, if the company got declared bankrupt in the year 2017, then three years prior to bankruptcy will be 2015, even if it may not be actually three years if counted in the days' terms.

8. DATA ANALYSIS

The Altman Z-score is the output of a credit-quality test that checks a traded on an open market traded organization's probability of bankruptcy. The Altman Z-score depends on five monetary proportions that can be ascertained from information found on an organization's annual report.

$$Z\text{-Score}=1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Where,

X_1 = working capital / total assets

X_2 = retained earnings / total assets

X_3 = earnings before interest and tax / total assets

X_4 = market value of equity / total liabilities

X_5 = sales / total assets

Initially a score of less than 1.8 was conceived to be dangerous and a company having that score would undergo a financial distress in next few years. Further with time, more refined version of the model came out which categorized the companies based on the score level. A score of above 2.9 is safe. A score between 1.23 and 2.9 is under grey zone and below 1.23 was declared to be financially distress.

For Altman Z Score, the dataset includes a set of financial figures are tested. For the purpose of descriptive analysis, the following results are obtained.

TABLE 1: DESCRIPTIVE STATISTICS OF THE Z SCORES OF BANKRUPT COMPANIES

	5th year	4th year	3rd year	2nd year	1st year
Mean	15.5729	7.89676	-40.1094	-29.2805	-84.2507
Standard Error	8.579501	7.380893	25.36252	17.4606	67.06753
Median	16.53059	7.081057	-19.6084	-22.7204	-16.324
Mode	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	27.13076	23.34043	80.20333	55.21526	212.0861
Sample Variance	736.0783	544.7759	6432.574	3048.725	44980.53
Kurtosis	-0.48438	-1.20833	5.20744	3.282956	9.048805
Skewness	0.01057	0.085071	-2.033	-1.58313	-2.9567
Range	88.21077	67.33056	291.4642	188.881	721.2021
Maximum	59.15574	41.56364	47.2801	27.59064	44.08103
Minimum	-29.055	-25.7669	-244.184	-161.29	-677.121
Sum	155.7294	78.96761	-401.094	-292.805	-842.507
Count	10	10	10	10	10
AAD	21.35582	19.57097	52.11071	39.37733	118.5741
MAD	16.80262	17.3093	31.68753	30.39473	37.411
IQR	30.41452	31.27646	62.41821	56.82205	67.58988

The above variables are used in the model of Altman Z score wherein the data shows the above descriptive statistics of the entire sample. Since the focus is on the bankrupt companies, it is better to derive the statistics for the bankrupt sample companies.

According to theoretical study, some variables like working capital by total assets and retained earnings ratio might be correlated, However, the variable is not eliminated in order to exercise the test in the traditional bankruptcy model of Altman Z Score.

As per the formula of Altman Z score, the companies are categorized into different groups depending on the score obtained. The company which obtains a score of less than 1.23 is regarded as a distress zone. A score between 1.23 and 2.9 is considered to be under the grey zone. A score of above 2.9 would be regarded as safe zone. The test is applied into a sample of 10 bankrupt companies and 10 non-bankrupt companies.

TABLE 2: DATA OF SAMPLE FOR NORMALITY TEST

Insolvent Companies	5th year	4th year	3rd year	2nd year	1st year
Amtek Auto Ltd	21.27693	-3.70535	-21.9641	20.20072	-8.925
Ang Industries Ltd	47.66008	38.72054	47.2801	-161.29	0
Indosolar Ltd	2.489924	-19.6279	10.80626	-32.7852	-677.121
Jaypee Infratech Ltd	11.78424	-9.2709	-42.1026	-12.6557	-23.723
Ivrci Ltd	-13.7471	17.54467	-62.492	-54.4427	-80.4514
Gammon India	62.49041	-79.3384	-125.889	-157.156	-111.647
Mic Electronics Ltd	-29.055	41.56364	-244.184	-50.5699	-50.8144
Videocon Industries Limited	33.21878	0	13.35199	-44.2009	-71.3713
Orchid Pharma Ltd	-0.38645	-25.7669	-17.2527	7.334084	1.810449
Alok Industries Ltd.	23.3323	14.16211	-72.2126	27.59064	24.00759

Before proceeding with the data analysis, it is important to arrive at the normality of the data. The normality of the data is necessary to check if the sample is representing the population. The normality of sample can be tested using Shapiro Wilkins Test. Each of the variables is tested for their normality to proceed with the model testing.

TABLE 3: SHAPIRO-WILK TEST

	5th year	4th year	3rd year	2nd year	1st year
W-stat	0.98921	0.954811	0.797876	0.848819	0.547172
p-value	0.99576	0.725478	0.013662	0.056239	1.31E-05
alpha	0.05	0.05	0.05	0.05	0.05
normal	yes	yes	no	yes	no

From the above table, it can be inferred that the data is normally distributed. That data of 3rd year, and 1 year is said to be not normal due to the discrepancies arising out of missing data of some companies. The default hypothesis was the data was not normal. Since the significance value is less than 0.05, the hypothesis is rejected.

TABLE 4: ALTMAN Z SCORE OF BANKRUPT COMPANIES

Insolvent Companies	5th year	4th year	3rd year	2nd year	1st year
Amtek Auto Ltd	21.27693	-3.70535	-21.9641	20.20072	-8.925
Ang Industries Ltd	47.66008	38.72054	47.2801	-161.29	0
Indosolar Ltd	2.489924	-19.6279	10.80626	-32.7852	-677.121
Jaypee Infratech Ltd	11.78424	-9.2709	-42.1026	-12.6557	-23.723
Ivrci Ltd	-13.7471	17.54467	-62.492	-54.4427	-80.4514
Gammon India	62.49041	-79.3384	-125.889	-157.156	-111.647
Mic Electronics Ltd	-29.055	41.56364	-244.184	-50.5699	-50.8144
Videocon Industries Limited	33.21878	0	13.35199	-44.2009	-71.3713
Orchid Pharma Ltd	-0.38645	-25.7669	-17.2527	7.334084	1.810449
Alok Industries Ltd.	23.3323	14.16211	-72.2126	27.59064	24.00759

FIG. 1: ALTMAN Z SCORE OF INSOLVENT COMPANIES

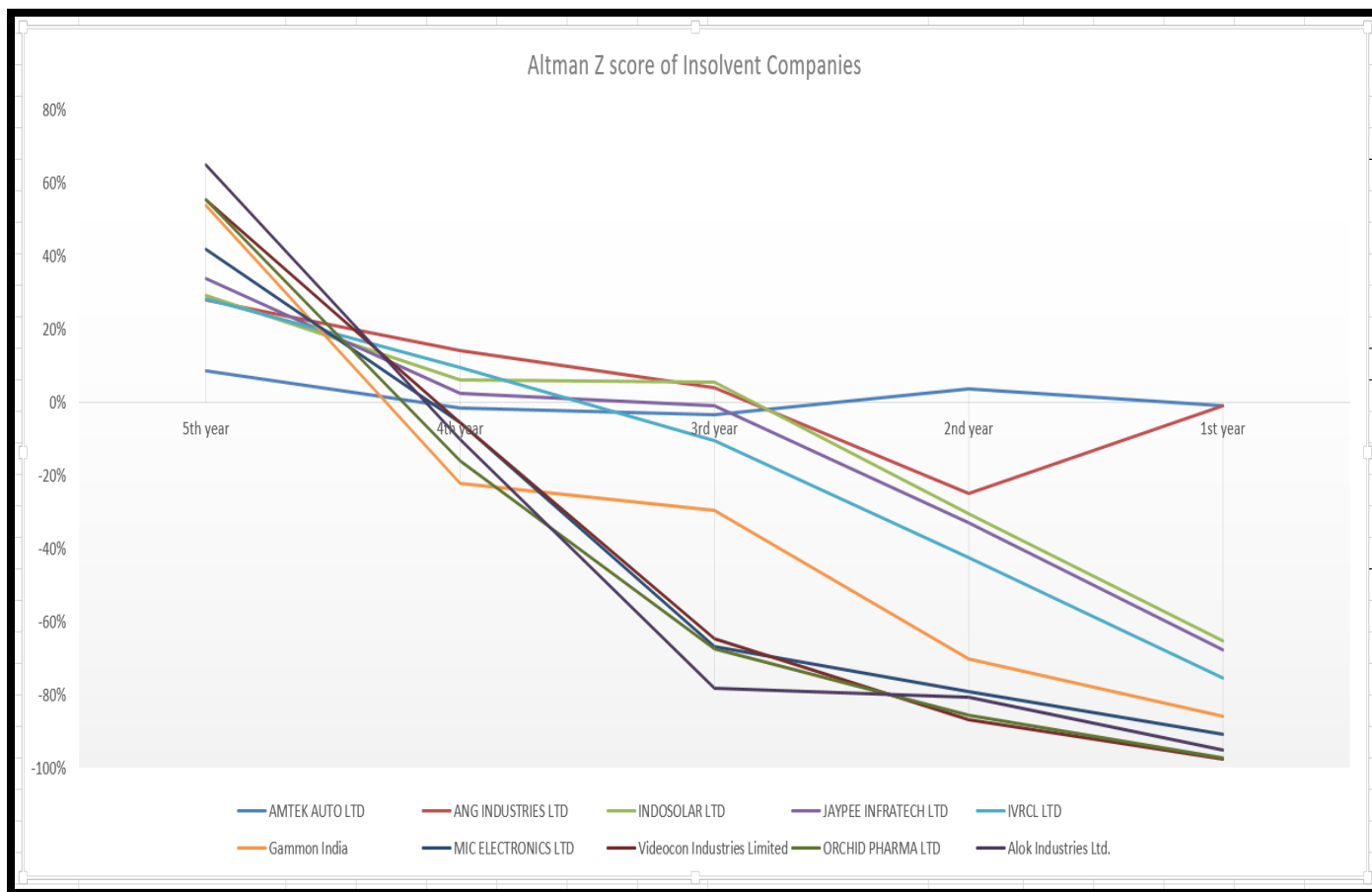


Figure 1 represents the Z scores of bankrupt companies mentioned in the table that it follows. It can be inferred that, in almost all 99% of the companies, a decreasing trend in the Altman Z scores 5 years prior to the filing of bankruptcy was seen. However, the rate of decline increased from the 3rd year onwards. Thus the hypothesis that Altman Z score can predict bankruptcy prior to 3 years, as constituted in the traditional theoretical model is proved. Hence, null hypothesis which claims that Z Score model cannot predict bankruptcy prior to 3 years is rejected.

TABLE 5: ALTMAN Z SCORE OF SOLVENT COMPANIES

Solvent Companies	5th year	4th year	3rd year	2nd year	1st year
Pricol Ltd	181.8528743	115.7171	108.7999	50.68359	42.75795
Sai Automative	209.4125371	191.7926	182.3247	216.4654	139.5454
Larsen and turbo	81.59021215	84.09161	82.01661	87.97394	75.18809
Jaiprakash Associates	36.99668001	33.28164	33.48934	38.92041	27.71244
JMC Projects	82.29333561	52.18373	84.86807	76.46177	80.55294
PUNJ LLOYD LTD	59.15573503	25.34771	-12.3244	8.014537	44.08103
Bharat Heavy Electricals Ltd.	39.06624747	51.10342	51.20928	54.85057	28.1918
Bharat Electronics Ltd.	68.85287845	83.35753	83.49603	92.14663	80.47454
Cipla Ltd.	90.80899572	81.87117	77.68812	79.36534	71.92741
Century Textiles & Inds. Ltd.	79.90165076	78.89169	92.20308	389.9165	75.74407

The scores of solvent companies are positive and most importantly above the stress levels as proposed in the Altman Z score model. However, some Z scores raise an alarm because in spite of being positive and above stress level, some companies like Pricol Ltd. And Century textiles Z Scores are seen on a decreasing trend. An exponential fall and rise can be seen from one year to another in companies like century textiles and Punj Lloyd. This could either be due to some internal change in strategy or effect of trade cyclical fluctuations of economy on such companies.

FIG. 2: ALTMAN Z SCORE OF SOLVENT COMPANIES

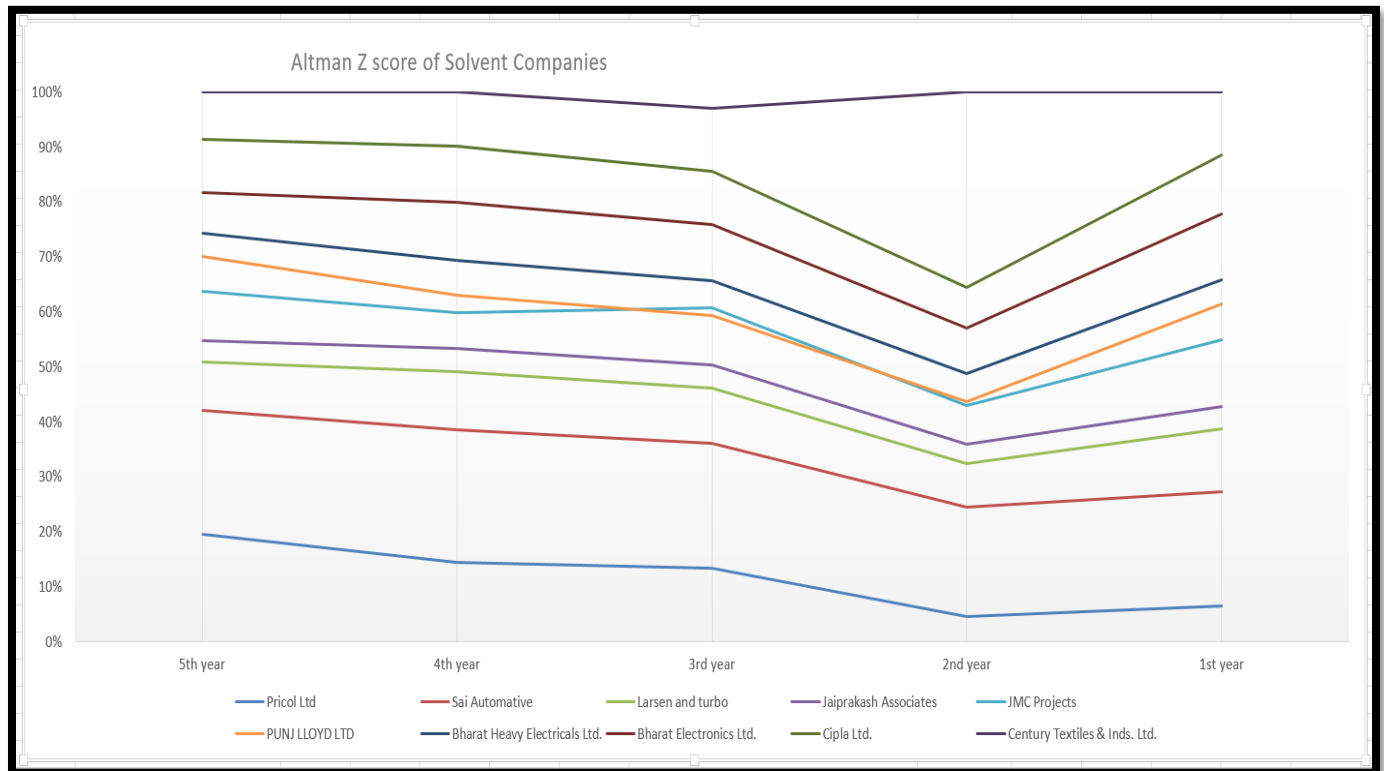


Figure 2, represents Altman Z scores of solvent companies belonging to similar sector or industry which the insolvent companies belong to. Contrary to the trend seen in the bankrupt companies, it can be inferred that the Z scores are increasing after second year. This trend also throws light on the cyclical fluctuations of global economic recession which started 4 years ago and its impact on certain sectors. Since, the financials were effected, the z scores of even the sound companies declined but not at a rate which the bankrupt ones did. However, in 2019, when the economy started recovering, the Z scores can be seen on a rising trend. The fall in the Z scores are not that deep.

Industry wise, Comparative Z score analysis

The automobile industry has seen and been through the worst phases in the past few years. However, very little has been spoken and written about auto ancillary industry. The two bankrupt companies in this industry show negative Z scores contrary to the solvent companies.

The stress level of infrastructure and construction industry go hand in hand because one supports the other. The companies belonging to textile and pharma industry can also be seen effected but as poorly as the companies belonging to infrastructure and construction industry. The Z scores are after all a byproduct of the financial statements of companies and reflection of them. The auto ancillary industry is represented by Pricol Ltd. And Sai Automotive. Where on one hand the latter has stable Z scores, the former's Z scores can be seen in a decreasing trend. If the Z scores of solvent companies were to be compared with those of bankrupt companies, there can be seen a horizon of a difference, where on one hand the solvent companies not only have positive Z scores but are also way above the stress level of the proposed model, and on the other hand the insolvent companies are not only below the stress level, but are negative and how.

9. FINDINGS OF THE STUDY

1. The overall accuracy of Altman Z score model in determining the risk of insolvency is high.
2. The financial ratios of the companies were sufficient to determine the risk of bankruptcy and can be applied in all of the industries. Although this research didn't cover the external factors.
3. The Altman Z score declared 9 out of 10 companies bankrupt, prior to 4 years as against the 2 years' prior in the proposed traditional theory.
4. The accuracy of the Z score model was based on the historical data and ratio analysis of financial statements. Any tampering of such data by the companies' administration itself may have affected the researches adversely.
5. It was noted that there were several modifications made to the Altman Z score with successive research paper which evaluated critically the original formula and came out with modified version to suit the new business models. However, in this paper, the original model is only considered.
6. Even though the ratios were obtained out of the similar financial data where in most cases was overlapping, there was still no high degree of correlation because of which that can be avoided.
7. Standalone ratio didn't fetch any useful insight. Among financial ratios, Debt Equity ratio was found to be a relevant ratio for determining the insolvency ratio. Debt to Equity ratio of ANG Industries stands at 0.55 which is better in terms of solvency but the bank came under IBC in the year 2016. Thus, ratios should be looked in tandem with each other.
8. If the models keep repeating the process of achieving higher accuracy, it may be more specific to the given sample. The sample of the solvent companies is quite small. Thus it fails to give a generic model if remain persistent with the model.

10. CONCLUSION

The predictive ability and accuracy of Altman Z score model is based on the underlying theory. In this paper there is involvement of Altman Z score model in predicting bankruptcy. Even though there have been several models developed in the past, the accuracy of the model under different circumstances can reflect non-uniform results. The data in this research includes the sample of Indian companies which are under bankruptcy proceedings or under IBC. The insolvency of Indian companies is a critical issue in the current context. Due to the insolvency of the companies, there is a spillover effect in the entire economy, this could be a reason why the Indian Government passed a ruling to not file for bankruptcy in 2020. Particularly when strategically important companies become insolvent. In the recent past, there were a lot of instances where in the insolvency of big companies like Bhushan Steel Ltd, Videocon Ltd and PC Jewelers Ltd have created a severe havoc in the entire banking system. Keeping this in mind, there is strict need to install a coherent system that could predict any forthcoming insolvency and could alert the banking system and save several stakeholders in the process. Keeping the value of the stakeholders in different businesses, there is a significant need of predicting the bankruptcy. This is because of the fact that the stakeholders should be cognizance if the firm with whom the a deal is going to get struck is under a risk of bankruptcy.

It is evident that the method and model applied in this paper are not exhaustive in nature. This is a major gap in this research. Thus, with evolution of several methods over the years the importance is mostly laid on the mathematical model instead of the theoretical model. Working with a mathematical model and information expands the objectivity of this examination. Be that as it may, there is some subjectivity related in the advancement of the model. In particular, the subjectivity concerns the time duration prior to which the proposed model is subjected to predict bankruptcy.

The research found that model does not produces any statistically significant difference in terms of the output. But, the output range differs in terms of the level of accuracy. This is based on the given sample, which may not be consistent with a different sample.

The paper concludes that; the market gives a prior indication of any forthcoming downturn. But the market is the effect of simultaneous expectation of several stakeholders which is based on the fundamentals of the company. Thus, there is no significant difference among the outputs. Given that, all the objectives of the research are achieved.

11. SCOPE FOR FURTHER RESEARCH

1. Different methods for obtaining a better sample that can represent the population in the specific manner.
2. Research in the areas of other methods like decision trees and geometric models and determining their accuracy in terms of the given updated sample.
3. An extensive Industry wise analysis can be made with more industries into consideration and industry specific models can be developed to check the feasibility of different models.

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