



A Study on Technical Analysis of Selected Public Sector Units in Indian Stock Market

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Abstract. Several studies have been published in the last 55 years exploring technical analysis. However, there is a lack of research that consolidates the available knowledge concerning technical analysis. The main goal of this paper is, by classifying, to summarize and systematize the significant research that has contributed to the development of the field. Our paper contributes to the existing literature on technical analysis by presenting an overview of characteristics of the literature and potential knowledge gaps in this area, focusing on the analysis of stocks. The paper also discusses suggestions for future research in technical analysis.

1. INTRODUCTION TO STOCK MARKET

The Meaning

Stock market is a place where the shares of different companies are bought and sold. The Organized Platform through which the buyers and sellers can trade in shares or other forms of securities like bonds, derivatives is called STOCK EXCHANGE. The stock exchanges could be a corporation or a mutual organization. They primarily serve the purpose of listing and trading the shares.

In India, there are two stock exchanges apart from Regional stock exchanges:

- 1) National Stock Exchange (NSE)
- 2) Bombay Stock Exchange (BSE)

Definition

The market in which shares are issued and traded either through exchanges or over-the counter markets. Also known as the equity market, it is one of the most vital areas of a market economy as it provides companies with access to capital and investors with a slice of ownership in the company and the potential of gains based on the company's future performance.

2. TECHNICAL ANALYSIS

It is the polar opposite of fundamental analysis, which is the basis of every method explored so far in this tutorial. Technical analysts, or technicians, select stocks by analyzing statistics generated by past market activity, prices and volumes. Sometimes also known as chartists, technical analysts look at the past charts of prices and different indicators to make inferences about the future movement of a stock's price.

Assumptions of Technical Analysis

Three key assumptions on which technical analysis is based are:-

- **The futures market discounts everything** - The technician believes that the price at any given time is the intrinsic value based upon the fundamental factors affecting the supply and demand of the product.
- **Prices move in trends** - Prices can move in one of three directions up, down or sideways. Once a trend in any of these directions is in effect, it usually will persist. The market trend is simply the direction of market prices, a concept which is absolutely essential to the success of technical analysis.
- **History repeats itself** - Technical analysis includes the psychology of the market place. Patterns of human behaviors have been identified and categorized for several hundred years and are found to be repetitive in nature. The repetitive nature of the market place is illustrated by specific chart patterns, from which one can forecast the next move for the prices.

3. CHART PATTERN

A chart pattern is a distinct formation on a stock chart that creates a trading signal, or a sign of future price movements. Chartists use these patterns to identify current trends and trend reversals and to trigger buy and sell signals. There are two types of patterns within this area of technical analysis, reversal and continuation. A reversal pattern signals that a prior trend will reverse upon completion of the pattern. A continuation pattern, on the other hand, signals that a trend will continue once the pattern is complete. These patterns can be found over charts of any time frame.

- **Head and Shoulders** - This is one of the most popular and reliable chart patterns in technical analysis. Head and shoulders is a reversal chart pattern that when formed, signals that the security is likely to move against the previous trend. As you can see in Figure below, there are two versions of the head and shoulders chart pattern. Head and shoulders top (shown on the left) is a chart pattern that is formed at the high of an upward movement and signals that the upward trend is about to end. Head and shoulders bottom, also known as inverse head and shoulders (shown on the right) is the lesser known of the two, but is used to signal a reversal in a downtrend.



Both of these head and shoulders patterns are similar in that there are four main parts: two shoulders, a head and a neckline. Also, each individual head and shoulder is comprised of a high and a low. For example, in the head and shoulders top image shown on the left side in Figure above, the left shoulder is made up of a high followed by a low. In this pattern, the neckline is a level of support or resistance. Remember that an upward trend is a period of successive rising highs and rising lows. The head and shoulders chart pattern, therefore, illustrates a weakening in a trend by showing the deterioration in the successive movements of the highs and lows.

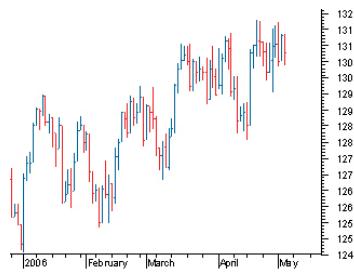
4. CHART TYPES

There are three main types of charts that are used by investors and traders depending on the information that they are seeking and their individual skill levels. The chart types are: the line chart, the bar chart and the candlestick chart.

- **Line Chart:** The most basic of the four charts is the line chart because it represents only the closing prices over a set period of time. The line is formed by connecting the closing prices over the time frame. Line charts do not provide visual information of the trading range for the individual points such as the high, low and opening prices. However, the closing price is often considered to be the most important price in stock data compared to the high and low for the day and this is why it is the only value used in line charts.

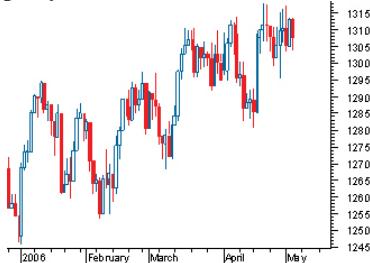


- **Bar Chart:** The bar chart expands on the line chart by adding several more key pieces of information to each data point. The chart is made up of a series of vertical lines that represent each data point. This vertical line represents the high and low for the trading period, along with the closing price. The close and open are represented on the vertical line by a horizontal dash. Conversely, the close is represented by the dash on the right. Generally, if the left dash (open) is lower than the right dash (close) then the bar will be shaded black, representing an up period for the stock, which means it has gained value. A bar that is colored red signals that the stock has gone down in value over that period.



A Bar Chart

- **Candlestick Chart:** The candlestick chart is similar to a bar chart, but it differs in the way that it is visually constructed. Similar to the bar chart, the candlestick also has a thin vertical line showing the period's trading range. The difference comes in the formation of a wide bar on the vertical line, which illustrates the difference between the open and close. And, like bar charts, candlesticks also rely heavily on the use of colors to explain what has happened during the trading period. A major problem with the candlestick color configuration, however, is that different sites use different standards; therefore, it is important to understand the candlestick configuration used at the chart site you are working with. There are two color constructs for days up and one for days that the price falls. When the price of the stock is up and closes above the opening trade, the candlestick will usually be white or clear. If the stock has traded down for the period, then the candlestick will usually be red or black, depending on the site. If the stock's price has closed above the previous day's close but below the day's open, the candlestick will be black or filled with the color that is used to indicate an up day.



A candlestick chart

5. OBJECTIVES OF THE STUDY

To analyze the price movements of shares of ONGC, SBI, NTPC, COAL INDIA, BHEL and interpret the corrections and trends by using Technical Analysis tools.

- 1) To forecast the future trends and provide suitable suggestions to the investors.
- 2) To identify the inherent technical strength and weakness of the equity shares.
- 3) To represent the trend of the stock price through charts of the technical analysis.

6. REVIEW OF LITERATURE

MassoudMetghalachi, Xavier Garza-Gomez, Yong Glasure and Yung-Ho Chang (2015) in their research paper entitled "Are the average trading policy profitable? confirmation from the Mexican stock exchange" the researcher studies three rules of average mobile technical trading for the Mexican Stock Exchange and the result specifies that the mobile average rules certainly have analytical power and can generate reliable profits.

Edwards, Magee and Bassetti" (2016) in their technical analysis of research refers to the study of market achievement as something divergent from the study of the goods in which the market deals. Technical Analysis is the science of recording, usually explicitly, the definitive history of changes in the negotiation price, the volume of dealings, etc., in a given action or in the averages and then deduce from that the past the potential future trend.

Jayakumar& K. Sumathi (2016) in their research work describes the use of technical analysis for the purchase and sale of shares listed in NSE. The investor can also recognize the return of the shares and the risk of the shares while investing money in the shares. The researcher had calculated the weekly average and standard deviation of EPS to make a decision regarding the purchase and sale of shares that appear in the list of NSE.

7. RESEARCH METHODOLOGY

- ❖ **Analytical Research:** Research Design was based on analytical research, on the other hand, the researcher has to use facts or information already available, and analyze these to make these to make a critical evaluation of the material.
- ❖ **Sources of Data:** The main sources of data are collected through website, various publication books, magazines, newspaper and reports prepared by research scholars etc.

Methods of Data Collection:

Secondary Data:

The study is purely based on secondary data. The secondary data are those which have already been collected by someone else and which have already been passed through the statistical process. The methods of collecting secondary data are published data or unpublished data. It takes short time and relatively low cost.

Statistical Tools Applied:

The analysis of data is carried out for secondary data by the following method.

- ✓ **Rate of Change (ROC)**
- ✓ **Relative Strength Index (RSI)**

❖ ROC (Rate of Change)

ROC stands for Rate of Change, and is one of the most well-known and popular of stock and share technical indicators. The ROC indicator is an momentum or velocity oscillator, with its movement oscillating around a central zero-point level. As with many technical indicators, a set period is used to compare with today's price. This period can be as small as 1 day or as large as 200 days or more, but the most typical periods used are 10, 12 or 25 days.

Calculation of the ROC Indicator

The ROC is calculated by looking at today's price and comparing this with the price at so many days ago, depending on the period used. It can be expressed as a simple price difference figure, or as a percentage-change figure. Whichever was is used, the Rate of Change indicator will be positive, negative or zero.

Calculation of the ROC as a simple price-difference figure as very easy - just look at today's closing price, deduct the closing price so-many days ago (depending on period used), and voila, you have the ROC figure.

To obtain the Rate of Change indicator as a percentage, the following calculation is used:

ROC = ((today's closing price - closing price at [period number of days ago]) ÷ closing price at [period number of days ago]) x 100

$$\text{ROC} = \frac{\text{today's closing} - \text{previous day's closing}}{\text{previous day's closing}} \times 100$$

Interpretation Of The Rate Of Change Technical Indicator

The Rate of Change Indicator can give a good idea of a stock, share or market's cyclical pattern of movement upwards and downwards, and the graphical display of ROC can be a way to identify these cycles better than just looking at the share price graph alone. When it comes to interpretation for buying or selling decisions, analysts consider that a ROC indicator which is at a high peak and starting to move down is an indication of a sell signal, whereas an ROC at a low peak, but starting to move upwards, is a buy signal. This is due to the theory that the higher the ROC, the more overbought the stock or share is, and the lower the ROC, the more oversold it is likely to be. It is also based on the idea that movement toward the zero line indicates that the existing trend is losing momentum. The best overbought or oversold levels are likely to vary depending on the stock or share under study, so it is a good idea to look at past patterns to assist in making a decision regarding a particular stock. In very strong upwardly trending bull markets it may be advantageous to use higher and lower peaks than in times of a weaker market.

Although more difficult to identify, divergences between the ROC trend and the stock price can be helpful in interpretation, with the movement of ROC and price in opposite directions considered to be a sign of a possible reversal of the stock price trend.

Some analysts also use the zero level as a basis of buy or sell decisions - buying when the stock moves from below the zero line to above, and selling when the stock moves from above to below the zero mark. However, other market technicians may consider this to be a slight over-simplification of ROC interpretation.

❖ RSI Technical Indicator

When applied to stocks, shares and securities, RSI stands for Relative Strength Index. It was originally developed by J. Welles Wilder, Jr, who first introduced the concept of RSI to the world in his 1978 book, New Concepts in Technical Trading Systems.

Unfortunately there are two different types (and meanings) of Relative Strength when it comes to stock market trading and this fact can lead to possible confusion. One of the types of Relative Strength is the type used to compare the performance of a particular stock with another stock or sector of the market, or with the whole market itself, or even to compare whole markets worldwide (for example to compare the relative performance of the UK Stock Market in comparison to the USA stock market). This type is not what will be discussed on this page, but instead the Relative Strength Index developed by J. Welles Wilder Jr. is a momentum oscillator which is based purely on the price changes of a single particular stock, share or security, and does not compare that individual stock to others or to a sector or the market as a whole.

Calculation of the RSI Indicator

Wilder's RSI looks at the positive and negative price changes over a period of days prior to "today" and, from these changes, calculates a RSI figure for "today" which can oscillate between 0 and 100. Wilde preferred to use 14 days as a period for calculation, and this appears to continue to be a popular choice, but some analysts and charts may use periods as low as 8 or as high as 25 days.

If we call the period of days prior to "today" the period, then to start out in the calculation of the RSI, we need to add together all of the positive price changes over the period.

Calculation:

$$RSI = 100 - \frac{100}{1+RS}$$

$$\text{Average gain} = (\text{Total gains} / n)$$

$$\text{Average loss} = (\text{Total loss} / n)$$

$$\text{Relative Strength} = \text{Average gain} / \text{Average loss}$$

$$\text{Relative Strength Index} = 100 - \frac{100}{1+RS}$$

N = number of RSI periods.

To simplify the formula, the Average Gain, the First RS, and the subsequent Smoothed RS's For a 20 period RSI, the Average Gain equals the sum total all gains divided by 20. Even if there are only 5 gains (losses), the total of those 5 gains (losses) is divided by the total number of RSI periods in the calculation (7 in this case). The Average Loss is computed in a similar manner. Calculation of the First RS value is straightforward: divide the Average Gain by the Average Loss. All subsequent RS calculations use the previous period's Average Gain and Average Loss for smoothing purposes.

RSI Interpretation

The RSI is a momentum oscillator, which measures the speed of directional price movement. According to Wilder, a divergence between the RSI and price action on the chart is a very strong indication that a market turning point is imminent. A divergence between the RSI and stock price action is where the stock is making new highs and the RSI is making new lows (or vice-versa).

RSI can also be used to identify when a stock or share is overbought or oversold. With a 14 day period RSI, many analysts consider that if the RSI drops to below 30 marks, it indicates that the stock is oversold, and so is a possible buy signal. Conversely, if the RSI rises to above 70, the stock may be overbought and it is worth considering selling. If a shorter period (for example 8 days) is used, you may wish to use a lower level (for example 20 to 25) as an oversold level, and a higher level (eg 75 to 80) as an overbought indicator. The lower number of days used for the period, the more volatile the RSI will be.

Overall, RSI is one of the most popular technical indicators, and analysts consider it to be among the most reliable. However, it works best with volatile shares, and may not provide as much success if used with shares whose price does not change much over time. Also, beware of large surges and drops in stock or share values - such sudden movements may produce a false buy or sell signal. It is best to use RSI as a compliment to your investing tools and information.

8. DATA ANALYSIS & INTERPRETATION

STEP - 1

Index Capitalization rate of all the sectors of BSE was identified on 28-oct- 2020. Out of these sector 1 sectors namely: (1) PSU (Public sector unit) has shown very high capitalization as compare to others.

27th-OCT-2020	
SECTOR	INDEX CAPT. (%)
AUTO	2.81
BANKEX	6.73
CD	0.34
CG	2.35
FMCG	4.39
HC	2.25
IT	3.79
METAL	2.03
OIL&GAS	4.11
POWER	2.01
PSU	24.73

REALITY	0.40
TECH	4.91

STEP-2

As per the market capitalization we have selected five companies from the PSU sector. The five companies are as follows.

As on 28/10/2020	
Company name	Market capitalization (%)
1) ONGC	15.38
2) SBI (State bank of India)	15.28
3) NTPC (NTPC Ltd)	7.3
4) COALINDIA	5.87
5) BHEL(Bharat Heavy ElectricalsLtd)	5.44

STEP 3 - RSI CALCULATION

Date	Close Price	change	Gain	Loss
3-Oct-19	268.55			
4-Oct-19	264.4	-4.15	0	4.15
5-Oct-19	264.2	-0.2	0	0.2
7-Oct-19	264.45	0.25	0.25	0
10-Oct-19	273.5	9.05	9.05	0
11-Oct-19	268.35	-5.15	0	5.15
12-Oct-19	270.5	2.15	2.15	0
13-Oct-19	265	-5.5	0	5.5
14-Oct-19	266.65	1.65	1.65	0
17-Oct-19	269.5	2.85	2.85	0
18-Oct-19	263.6	-5.9	0	5.9
19-Oct-19	268.35	4.75	4.75	0
20-Oct-19	266.8	-1.55	0	1.55
21-Oct-19	265.4	-1.4	0	1.4

Calculation

FORMULA FOR CALCULATING RSI:

$$RSI = 100 - \frac{100}{1 + RS}$$

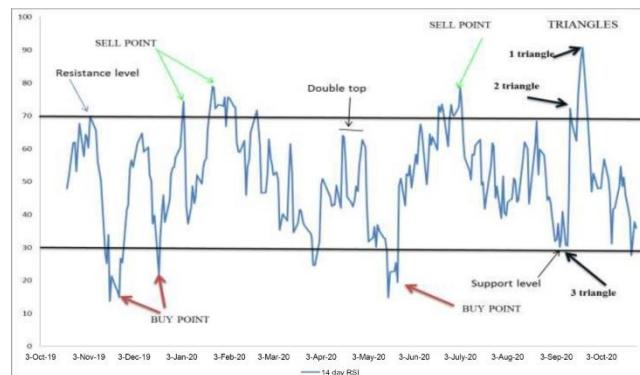
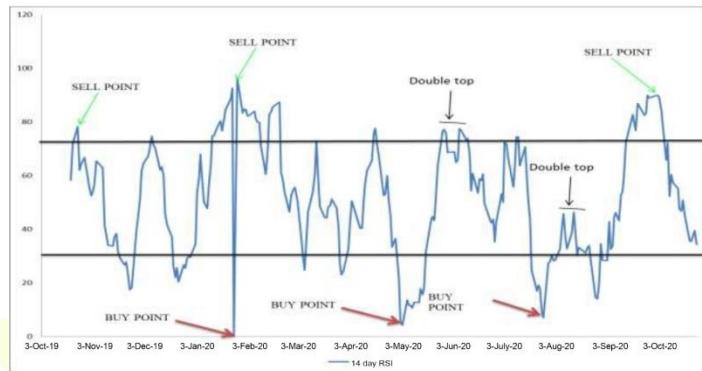
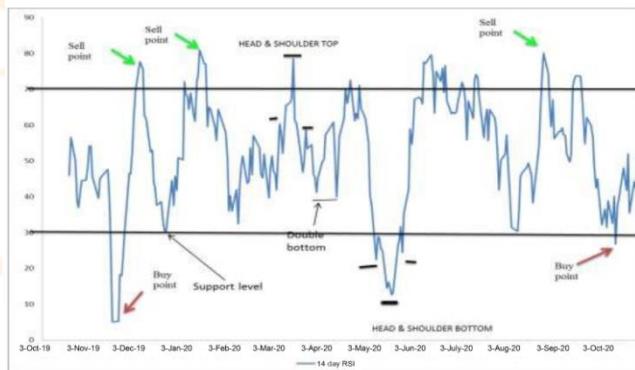
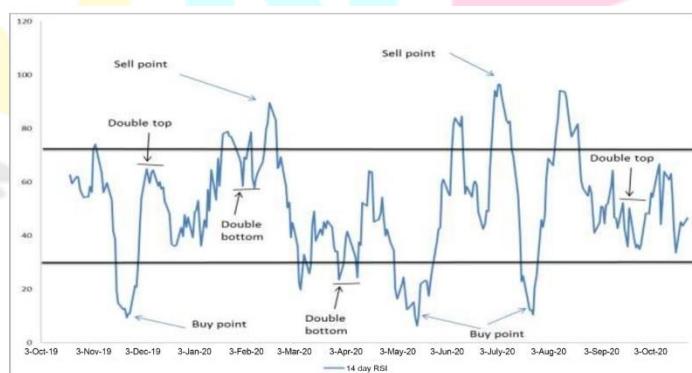
$$\text{Average gain} = \text{Total Gains} / n = (20.7/14) = 1.47857143$$

$$\text{Average loss} = \text{Total Loss} / n = (22.45/14) = 1.60357149$$

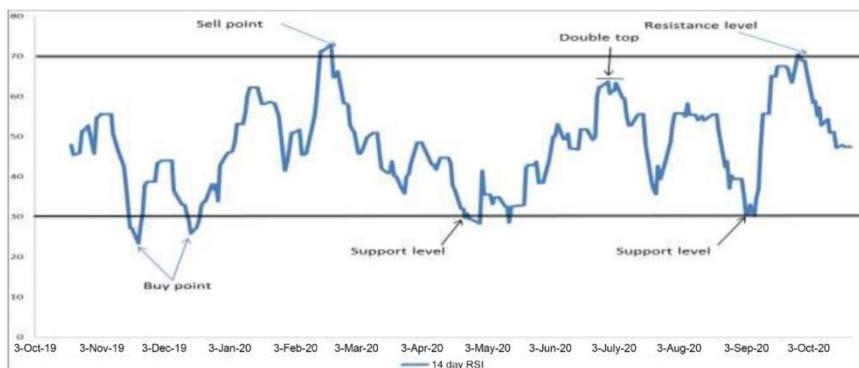
$$RS = \frac{\text{Average Gain}}{\text{Average Loss}} = 0.922049$$

$$\begin{aligned} RSI &= 100 - (100 / 1 + RS) \\ &= 100 - (100 / 1 + 0.922049) \end{aligned}$$

$$RSI = 47.97$$

CHART OF RSI METHOD FOR ALL FIVE SELECTED COMPANY**1) ONGC****2) SBI BANK****3) COAL INDIA****4) NTPC (National Thermal Power Corporation Limited.)**

5) BHEL



STEP 4- CALCULATION OF ROC

Date	Close Price	ROC -1 Method (%)	ROC -2 Method (%)
3-Oct-11	1862.75		
4-Oct-11	1786.7		
5-Oct-11	1715.3		
7-Oct-11	1751.85		
10-Oct-11	1754.55		
11-Oct-11	1765.1		
12-Oct-11	1872.25		
13-Oct-11	1886.95		
14-Oct-11	1882.5		
17-Oct-11	1891.8	101.5595222	1.559522212
18-Oct-11	1863.4	104.2928304	4.292830358
19-Oct-11	1919.1	111.8813036	11.88130356

Formula for calculation of ROC

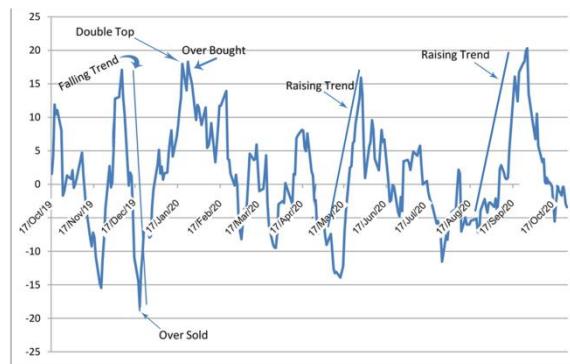
ROC= ((today's closing price - closing price at [period number of days ago]) ÷ closing price at [period number of days ago]) x100

$$\text{ROC} = \frac{\text{today's closing} - \text{previous day's closing}}{\text{previous day's closing price}} \times 100$$

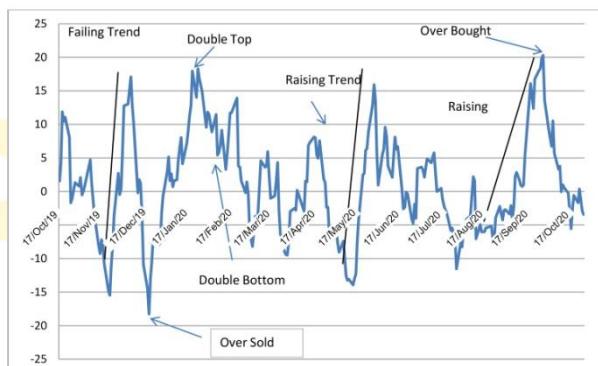
$$\begin{aligned} \text{ROC} &= \{(1891.8 - 1862.75) / 1862.75\} * 100 \\ &= 1.559522212 \end{aligned}$$

CHART OF ROC METHOD FOR ALL FIVE SELECTED COMPANY

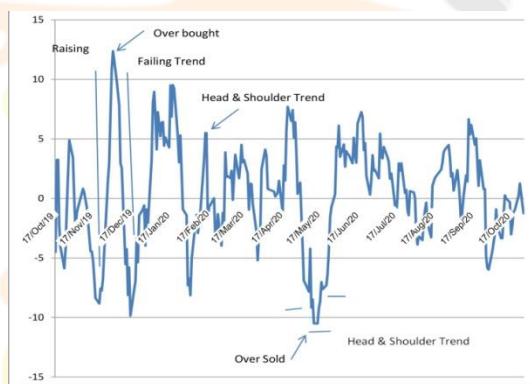
1) ONGC



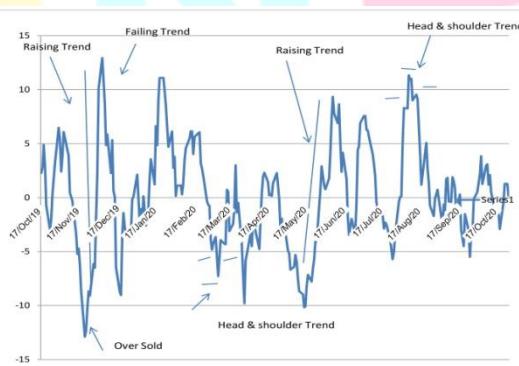
2) SBI BANK

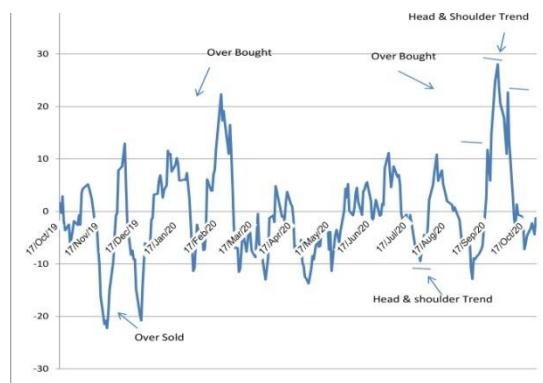


3) COAL INDIA



4) NTPC





9. SUMMARY OF FINDINGS

❖ ONGC

- ❖ Resistance level is provided thus the price started declining in November.
- ❖ Twice buy & sell point occurs within 1 month duration.
- ❖ Support level is provided in September as result price started rising.
- ❖ With respect to ROC, falling trend has been observed & because of oversold it continuous.
- ❖ Overbought along with double top trend has been seen In JANend

❖ SBI

- ❖ During November share price is at minimum point thus it gives the buy signal to the investors.
- ❖ Double top trend has been repeated twice, one is within limit & another is crossing the resistance level in the month of Jan & Feb.
- ❖ In the month of April bottom Head & Shoulder is noticed
- ❖ Raising trend has been found in the end of May & August.

❖ COALINDIA

- ❖ Support level is provided in the beginning of Jan 12 as result price rises.
- ❖ Bottom Head & Shoulder has been found in May 12.
- ❖ Buy call is twice & 3 sell call has been observed.
- ❖ Double bottom is seen in November & April.
- ❖ Top Bottom Head & Shoulder has been found in February & May respectively.
- ❖ Raising trend is observed in the month of December as it is overbought.

❖ NTPC

- ❖ Continuous fluctuation of prices has been found in scrip of NTPC.
- ❖ 2 Double bottoms & 2 Top bottoms has been found thus high variation in price & trend is followed.
- ❖ Raising trend is seen in December & again price reaches its historic value in January.
- ❖ Top Bottom head & shoulder are seen in March & August respectively.

❖ BHEL

- ❖ Twice support level has been provided in the month of May & September.
- ❖ Double top trend is observed in the month of July.
- ❖ Two Bottom head & shoulder and one top head & shoulder are seen in the charts.
- ❖ One symmetric triangle is found in March.

10. SUGGESTIONS

- ❖ The investors should be trained to use the technical analysis tools. Since it will help them in their day to day investments to get more returns.
- ❖ Fundamental analysis can also be suggested to the investors together corporate, growth of earnings and profitability.
- ❖ The company should orient the investors to mainly watch the business, economic, social and political factors that affect the supply and demand for securities.
- ❖ The investors can also use more number of charts which will depict a true picture on the movement of these securities.
- ❖ The investors should analyze market data in real time; plan your own market timing strategy to make money, regardless of upwards and downwards trending markets.
- ❖ Minute – by – Minute trading volume shows the reversal points of the market, and therefore when to buy and sell can be identified.

Buying and selling of stock is not an easy task if you want to make money doing it. Millions of investors have lost the money in past trying guessing stock price movements. In order to consistently make money in the stock market, investors have to be right over 70% of the time.

In today's world, if you rely on fundamental analysis, broker's advice newspaper, articles or business channels for your investing or trading decisions, you are asking for a painful experience in the markets. So, this study on technical analysis will help the investors in analyzing the scripts based on the technical tools and oscillators to earn fruitful investment.

Technical analysis is the art and science of chart patterns in order to better analyze and predict prices of a given security. It is also becoming popular with the younger generation. But further research has to be conducted to know whether the technical analysis alone will guarantee profits to the investors. Knowledge of the stock markets is the key to the success and emphasis should be on managing trading risk while technical analysis can help you to control them.

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