



# Survey paper on Technical Indicators of the Stock Markets

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## Abstract

Stock Markets also known as Temple of Capitalism, which is generally considered to be one of the most interesting things in today's world. Each second Millions of Shares are traded, Thousands money and thousands lose. Some consider it to be pure luck and random movement of price, but at least today with advent of internet and smartphones in everybody's hands, the understanding of markets has increased many folds. The science of stock markets for a person coming to markets can be understood using 2 pillars of markets and its behavior, these are the fundamental and the technical aspects of a stocks listed on exchanges. Here we will be mostly discussing the technical analysis, which basically is tracing and charting the OHLC of a stock and the no. of stocks traded in a particular timeframe i.e. Volumes. The indicators part of the technical analysis are by product of price and volume which are played around in a fancy manner using mathematical modulating the OHCL value of a stock and its corresponding Volume. This paper tries to combine various past studies on different technical indicators, their reliability in terms of back testing, use case and the return which can be generated using them, and other dimension of each technical analysis indicator and critically analyze the research papers and to put forward a new methodology to compare performance of different indicators in Indian stock markets context.

**Index Terms** – Technical Analysis, Fundamental Analysis, Indicators, Back testing, RSI, Nifty 50, Market Structure, MACD and Moving Average.

## I. INTRODUCTION

Technical analysis is the one of the tool used by investors and traders to examine the market structure, price volume behavior and to find out short term trading opportunities to enter or exit the market, at the core of technical analysis is price and volume and the rest of the concepts which are derived from these two, via this the traders and investors attempt to predict the future.

The Science of technical analysis dates back to 17<sup>th</sup> century in Europe where Joseph de la Vega adopted early technical analysis techniques to predict Dutch markets. In today's era it is heavily influenced by Charles Dow, William P. Hamilton, Robert Rhea, Edson Gould, and many others. These theories were brought together and compiled in 1948 with publish of *Technical Analysis of Stock Trends* by Robert D. Edwards and John Magee. Even the candle stick patterns date back to the Japanese merchants and the rice harvest.

Indicators which are part of the technical analysis are used by traders in order to gauge the market and gain an insight into the demand and supply of listed companies, they basically confirm will the price continue to behave in the similar manner and will it continue with came momentum or not. Some of the very famous indicators are Relative strength Index (RSI), Moving averages, Bollinger Bands, Relative Strength, volume Weighted Average Price (VWAP), Moving averages convergence divergence (MACD), these indicators can be used to generate buy and sell signals to the investor.

## II. OBJECTIVE

This paper tries to combine various past studies on different technical indicators, their reliability in terms of back testing, use case and the return which can be generated using them, and other dimension of each technical analysis indicator and critically analyze the research papers and to put forward a new methodology to compare performance of different indicators in Indian stock markets context.

### III. LITRATURE REVIEW

Reena Baral, Abhishek Kumar Chintu (2013), stated that Technical Analysis serves the institutional investors in deciding the direction of the market to yield good returns and to meet expectations. It helping the investors to in terms of generating entry and exit signals especially RSI which shows concurrency in stock chart and RSI in generating buying and selling signals. The value of RSI decrease giving good entry signal to buy to stock and vice versa [1].

Terence Tai-Leung Chong, Wing-Kam Ng, Venus Khim-Sen Liew(2014), "Revisiting the Performance of MACD and RSI Oscillators", observed RSI and MACD works well in most of the exchanges throughout the world in both bull, bear and volatile sideways market. In some situations RSI and MACD can generated abnormal returns in some of the developing markets of the world [2].

"The Impact of Volatility on the Implementation of RSI," Renaud Beaupain, Lei Meng, and Romain Belair (2010). In the Chinese stock markets, this research investigates the impact of volatility (measured as an exponentially-weighted moving average) on the execution of a trading rule based on the relative strength index (RSI). The authors look at how sensitive the choice of RSI bounds is to different volatility regimes using tick-by-tick data from the Shanghai stock market. The paper presents empirical proof that the boundaries established on this technical indicator have no meaningful impact on the return and risk of our portfolios in high and low volatility regimes. However, we show that some strategies provide a better return-risk package than others within each volatility regime [3].

according to Adrian Taran-Morosan (2011), "The relative strength index revisited." the relative strength index (RSI) is one of the most well-known and commonly used technical analysis indicators, The purpose of this study was to examine the performance of the RSI in its traditional form on a set of data and to reconfigure the indicator by using trading volume in its calculation method. The study tests its new form on the same set of data after changing the RSI with the trade volume. Finally, the findings obtained using the classic version of the indicator are compared to those obtained using the adjusted form. It indicates that while RSI performs admirably in its current form, it may be enhanced by taking into account additional aspects such as volume [4].

As per the Dr. Srinivas Gumparthi, Dr. Bhargavi. R, Anith.R (2017), their study included selection of stocks based on Earnings per share and profit/earning parameter in the period of 2011 to 2013 and tested the validity of RSI result in trading strategy in short term and long term investing. The study found that RSI can be effectively used in making portfolios with a short term and a long term view, it can accurately predict buy and sell signals and the same time it concluded that P/E ratio is better indicator of profitably in comparison of EPS [5].

### IV. METHEDODOLOGY

Based of the above literature review of various studies we plan to address some of the drawbacks by the following model which will help do a comparative study of technical indicators in context of the Indian stock market

**TOOLS AND RESOURCES:** python 3, Jupyter notebook, python libraries: pandas, numpy, matplotlib, seaborn

**DATA SET:** Current NIFTY 50 stocks historic data from nsepy package and storing each value into data frames of each stock from 1<sup>st</sup> Jan 2010 to 31<sup>st</sup> Dec 2020.

**TECHNICAL INDICATORS:** the technical indicators which will be used for the comparative study are :

1. Relative strength Index RSI
2. Bollinger bands ( BB)
3. Moving averages 200-50 DMA cross over
4. Moving averages convergence divergence MACD

The above indicators will have buy, sell, stop loss, and target/ book profit signals.

All the above indicator will be tested against data of each stock of nifty 50 from 1<sup>st</sup> Jan 2010 to 31<sup>st</sup> Dec 2020. And the following parameters will be gauged for performance of indicators on each stock of the nifty 50 and the results will be visualized using matplotlib and seaborn library of python.

The performance of the 4 indicators on each stock will be tested based on the following functions:

1. max profit in a single trade
2. max loss in a single trade/ max draw down.
3. Return on investment
4. Total no of trading signals generated, win % in trades on a single stock and Average win % of trades in all 50 stocks
5. Average ROI in winning stocks
6. Did it out perform NIFTY 50 annual returns, FD returns or the stock grown itself or not.

The indicators who will we having the best Win rate and highest ROI will be the deemed as the best performing indicator on nifty 50 stock form 1<sup>st</sup> Jan 2010 to 31<sup>st</sup> Dec 2020.

**Using statistics and basic supervised machine learning algorithms (linear/Logistic regression), we will also try to find correlations between NIFTY 50 index movement and other parameters:**

1. Between NIFTY 50 and volatility index ( India VIX )
2. Between Nifty 50 and Open of SGX Nifty
3. Between Nifty 50 and USD/INR exchange rate
4. Between Nifty 50 and Gold price
5. Between Nifty 50 and Crude oil price.

These parameters will help us understand the behavior of the Nifty 50 benchmark index in relation to the above data points and help is arrive a logical and rational conclusion.

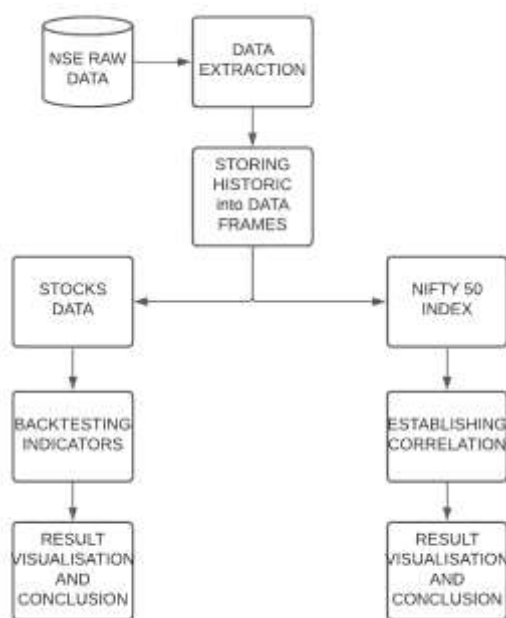


Fig 1: System Architecture

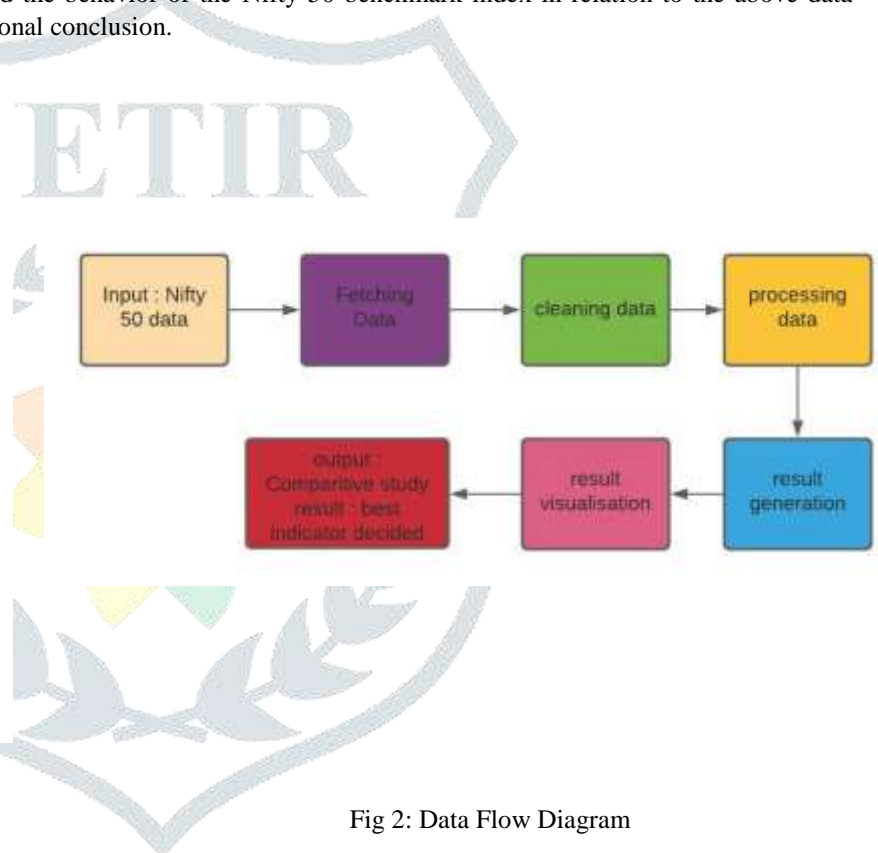


Fig 2: Data Flow Diagram

## V. DRAWBACKS AND CONCLUSION

Even though a lot of Research has been done on various technical indicators, such as RSI, MACD, Moving averages, Bollinger bands etc. but most of the studies are based on foreign markets, studies based on Indian stock exchanges are limited when it comes to studying the overall behavior of technical indicators at the same time there is no comprehensive comparative study of technical indicators against each other, and how to they perform in the Indian markets. Even though there are many research papers published related to RSI, MACD or moving averages in original format or in some modified form on Indian stocks but most of them lack large sample size and majority of them are confirmed to low beta and blue chip stocks making it hard to conclude regarding a particular indicators effectiveness in various phases of market structure of Indian markets.

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