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TECHNICAL ANALYSIS AND ITS USE IN THE STOCK MARKETS

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Abstract

The study is aimed to understand whether the charting patterns (Japanese candlesticks and classical price patterns) work for the charts of smallcap and midcap companies. Also, whether charting patterns can be relied upon as a tool for technical analysis or not. The study takes into account various charting patterns (both, Japanese candlestick patterns and classical price patterns) and sees if they work for these companies as well. Systematic sampling was chosen and companies were categorised on the basis of their market capitalization. Three companies from both, midcap and smallcap categories were considered as the sample of the study. Upon analysis, it was found that the 16 patterns (11 Japanese candlestick patterns and 5 classical price patterns) existed in the sample considered for the purpose of study and those patterns had a success rate of 75% and the number of patterns so found were more in the smallcap companies than the midcap companies. Japanese Candlesticks had a success rate of 72%, whereas the classical price patterns had a success rate of 80%. If the patterns are observed correctly and a person enters (and exits) into trades timely, then he/she can reward himself tremendously with just little work and practice.

Introduction

Technical Analysis is a type of study used by investors and traders to predict prices and take decisions accordingly. It can be defined as an art and science of forecasting future prices based on an examination of the past price movements. It is not an astrology for predicting prices. It is based on the analysis of market forces of current demand-supply of commodities, indices, stocks, or any other tradable security. It involves the plotting of information like prices, volumes, and OI (open interest, a term used in futures' trading) on a chart and then applying different patterns and indicators on that information in order to get an idea of direction of movement of the price of the security. Technical Analysis is used in various time frames, ranging from intraday (1 minute, 5 minutes, etcetera) to daily, weekly, monthly and years. Technical Analysis is one of the two methods (Fundamental Analysis is the other one) used for analysing investment decisions in the securities market.

Technical Analysis is built on these premises –

1. Price discounts everything.
2. Price movements do not occur randomly
3. The 'what' is more important than 'why'

These theories were some of the few theories put by Charles Dow, a renowned American Journalist, famous for his publications. Below is the explanation of the theories –

1. **Price Discounts Everything** – Analysts believe that the current market price of the security will reflect every possible material information which can have an impact (change and affect) on the price. Analysts believe that the stock will perform similarly in the future (under similar circumstances) as it had performed in the past.
2. **Price Movements are not totally random** – Technical analysis follows a principle of following the trend. Analysts believe that prices of securities do not change randomly. Rather, it follows a trend (uptrend or downtrend). Money can be made as the trend unfolds.
3. **The 'what' is more important than 'why'** – Technical Analysts should be concerned with only two things –
 - a. The current price
 - b. How the price behaved in the past

By focusing just on price and nothing else, it helps the analysts get a direct and unambiguous picture. As the price is the most important aspect for that is what will make the trader's trades profitable, the analyst should be concerned only and only with that. The motivation for taking up this topic was that both of these, stock markets and technical analysis, are my areas of interest. I like to keep learning about the markets. Considering the scope of this field, if it (Technical Analysis) is combined with Fundamental Analysis, and Algorithmic Trading, it can do wonders. It is a topic which is very subjective because it is more like interpretation

and prediction of prices, and varies from person to person. Current developments in this field are very personal and dynamic, and are growing at constant rate because people who have extensive knowledge of this subject have started creating their own trading strategies and then they trade accordingly.

Research Objectives

The objectives of the research are as below –

- a. To determine the reliability of technical analysis using charting patterns (both, classical and Japanese candlesticks).
- b. To test the reliability of such charting patterns on small and midcap companies.
- c. To find the applicability of theory of charting patterns in practice.

Literature Review

According to Chitra, R. (2011), The author believes that technical analysis helps an investor to determine the intrinsic value of a share and understand if it is overvalued or undervalued, which, is totally wrong. Fundamental Analysis helps to understand this, not Technical Analysis. The concepts of Relative Strength Index (RSI) and Moving Averages could have been explained more properly. GopalaKrishnan, M. M. (2017) in the paper has mainly used the statistical tools, and only two tools of Technical Analysis (Beta and Alpha). A little explanation of the tools used would have helped a layman to understand the paper in a better way.

Ansary, O. A. (2017) have claimed that they are the first people who are studying the impact of Technical Analysis in Egyptian Securities Market, whereas this is not the case. Another paper which had findings similar to this paper, was accepted on 30th January, 2017 whereas this paper was accepted on 21th February, 2017. The paper was very good and has considered some of the major tools of Technical Analysis like Stochastics, RSI etc. Masry, M. (2017) has only considered the simple moving average (SMA) which is not very efficient and does not take into account other tools. Except for the tools used, the paper explains everything in an insightful manner which is easy to understand.

Rakshith L, D. M. (2018) have only chosen one tool (RSI) which is not sufficient enough to provide with reasonable findings. It was wise of the authors to choose multiple sectors for the study and not stick to a single sector. Pandya, H. (2013), the author of the paper, has considered some of the most prominent indicators (tools) which increases the efficacy of the study intended.

Valarmathi A, K. P. (2016), in the paper, takes into account the EMA of 12 and 48 days, whereas an EMA of shorter period (say 12 and 26 days) is much more optimal and efficient. The findings and suggestions could have been better. It stated only the general things which almost everyone knows about. In the paper of Manoj RS, D. S. (2018), The conclusions made in the paper are on the basis of results from Fundamental Analysis, whereas the paper is concerned with the effect of Technical Analysis. So, I doubt the interpretation done is wrong. The paper makes good use of graphs and is written in a good manner.

Srivastava, D. A. (2015) has filled the paper with a lot of tables. Also, the author should have given a more specific conclusion instead of generalizing their result. The data could have been compiled (and presented in the appendix) and the article would have looked more presentable.

In the paper of J. G. Agrawal, D. V. (2013), the paper has presented only theoretical knowledge, and no kind of application on any security. The paper could have some more graphs or tables which would have made it more appealing.

Deepika Chandwani, M. S. (2014) in his paper makes the study more effective by adding another variable – Machine Learning along with some of the most prominent technical indicators. The RSI and MACD period considered by M.S.Ramaratnam, R. (2011) for the paper will affect the results of the study since the authors have chosen a period different from what is generally accepted as efficient and more resulting.

The paper of IVANOV Mikhail, R. A. (2014) have made only theoretical findings and no application part of the knowledge. Also, Technical Analysis was not well explained as it should have been. The extent of knowledge given could have been better. In the paper of Wafi, A. H. (2015), an attempt has been made to find which is better – Fundamental or Technical Analysis, which is incorrect. Both of the subjects are different and are unique in their own. One cannot be better than the other because of their implications. The paper should have used technical tools for the study of technical analysis (it makes use of pure statistical tools).

B. Sudheer Kumar, D. G. (2012) claims to make use of RSI and other technical indicators, but it does not. Also, what technical indicators will be used are not defined in the methodology as well. The charts could have been enlarged so that the reader has a better idea of them. In the paper of Dr.S.Kamalaravanan. (2018), SMA has been used as one of its tools, which in comparison to EMA, is inefficient. Better tools of technical analysis could have been taken.

The paper of Ibrahim, H. S. (2017) tests the study using a period of 5 day for RSI, which is not a good choice. A period of 14 days (for RSI) is considered as ideal. The paper is full of tables, the data could have been presented in a more sophisticated way. After going through the paper of Dhole, D. (2017), it was observed that the paper has only theoretical findings, and that too, the explanation was not done in brief as it should have been. A more comprehensive and in-depth knowledge of the topics could have been provided.

TALWAR SHALINI, P. S. (2019) describes the findings of the paper in a very good manner, and the paper makes good use of some well-known tools of technical analysis.

Research Gap

After going through all the research papers and articles, it was observed that the research projects were limited to the use of technical indicators (like Relative Strength Index [RSI], Moving Average Convergence Divergence [MACD], Bollinger Bands etcetera) and the companies chosen were mainly blue chip, large cap companies. This paper aims to fill that gap. The research paper will take into account the use of classical price patterns and Japanese candlesticks (a type of chart) of securities for predicting their prices, giving emphasis and importance to the small and midcap companies.

Research Methodology

Sample size - The sample for the purpose of the study of this paper has considered three companies which fall under the mid-cap market capitalization category.

Technique of Sampling used - The technique of sampling for drawing the sample for the paper is Systematic Sampling. It is done by selecting every 'Kth' subject from a list of the members of the population. 'K' is determined by dividing the size of the population by the desired sample size. Then, we start at some random place in the population list and then every Kth individual is taken on the list.

For the purpose of the study, data was extracted from [NSE India](#). The [top 500 companies](#) as on 31st March, 2020 (by their market capitalization) were chosen.

Definition of Midcap Companies - For a company to be called as a midcap company, it should have a market capitalization of more than Rs. 5,000/- crores, but less than Rs. 20,000/- crores. So, a total of 157 companies were found out which were meeting this criteria and were falling under the 'top 500 companies by their market capitalization' category.

So, finding out the value of K_M, we get 52 (rounded off). So, starting from the third sample, the consecutive samples would be – fifty-fifth and one-hundredth seven. According to this technique, the three companies are – Motherson Sumi Systems Limited (third sample), WABCO India Limited (fifty-fifth), and Vinati Organics Limited (one-hundredth seven).

Definition of Smallcap Companies - For a company to be called as a smallcap company, it should have a market capitalization of less than Rs. 5,000/- crores.

So, a total of 239 companies were found out which were meeting this criteria and were falling under the 'top 500 companies by their market capitalization' category.

So, finding out the value of K_S, we get 80 (rounded off). So, starting from the third sample, the consecutive samples would be – eighty-third and one-hundredth sixty three. According to this technique, the three companies are – Godfrey Phillips India Limited (third sample), Teamlease Services Limited (eighty-third) and Gujarat Narmada Valley Fertilizers and Chemicals Limited (one-hundredth sixty three).

Time Series Data – The time period of data used for the purpose of this study was six (6) months.

Definition of Market Capitalization – It is the market value of all outstanding shares of that specific company. It is calculated as –

Market Cap = Current Market Price (CMP) X Number of Outstanding Shares

Types of Charts considered for the study – The paper uses the two types of charts which plot closing prices of securities at various times of intervals. The two types of charts which have been used are –

A. Line Charts – Formed by connecting the closing prices of a stock over a given period of time.

B. Candlesticks – These charts show the open, high, low, and closing price in a format which is identical to modern-day bar chart, but in a manner which shows the relationship between the opening and the closing prices.

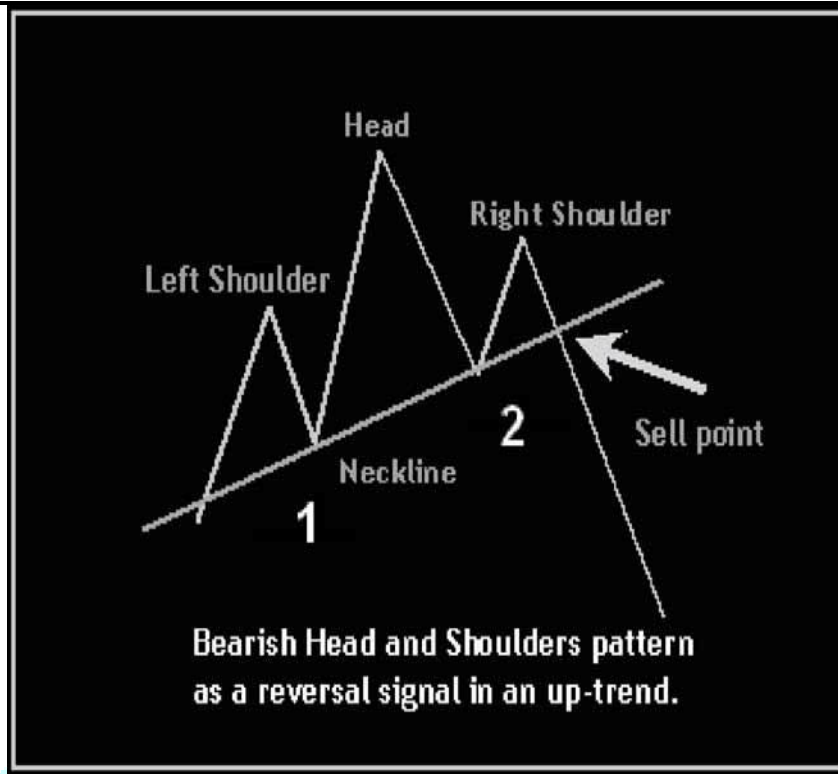
Different types of patterns are based on these charts.

Price Patterns – There are two types of price patterns used to identify trading opportunities in the secondary market –

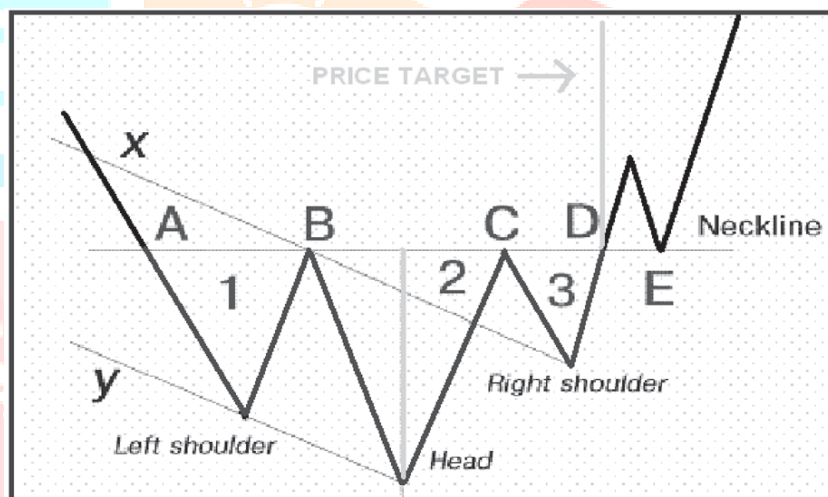
1. Classical Patterns –
 - A. Continuation Patterns (continuation of previous trends)
 - B. Reversal Patterns (reverses a previous trend)
2. Japanese Candlestick Patterns

Types of Classical Patterns used for the purpose of the study–

1. Head and Shoulder Pattern (reversal pattern) -

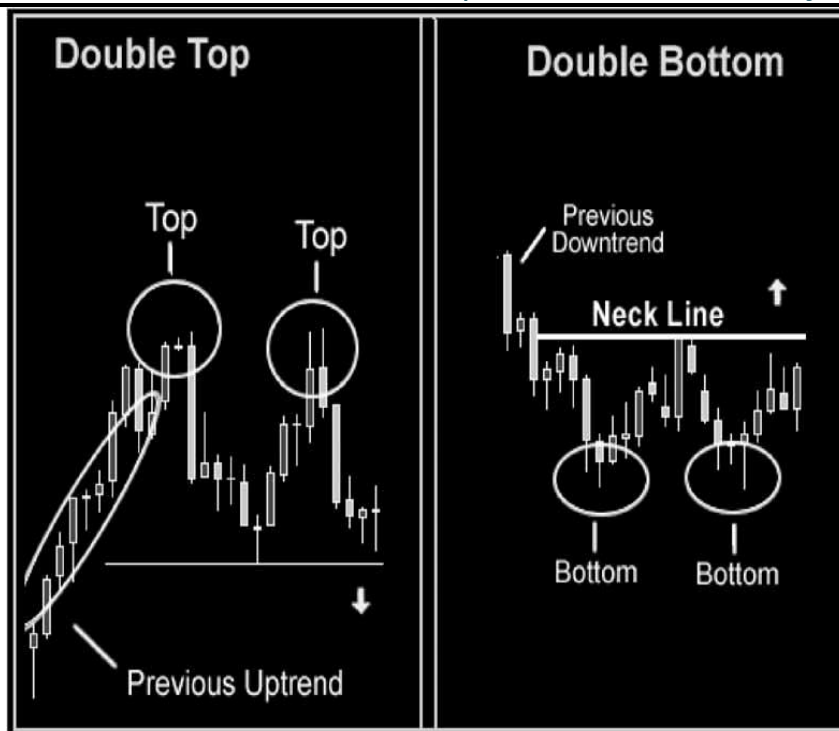


2. Inverted Head and Shoulder Pattern (reversal pattern) -

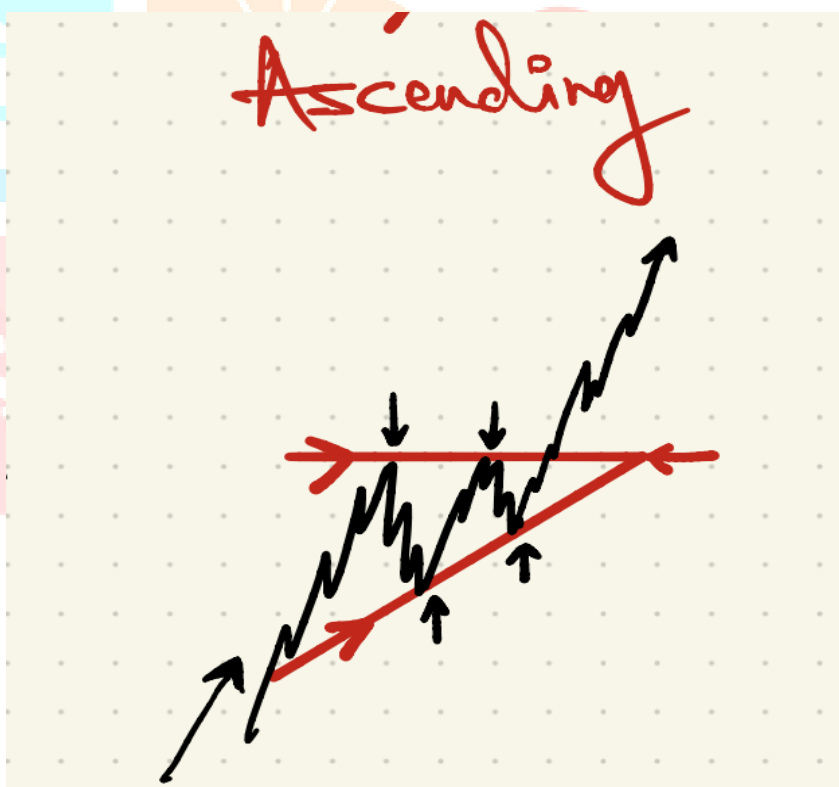


3. Double Top Pattern (reversal pattern)

4. Double Bottom Pattern (reversal pattern) -



5. Ascending Triangle (continuation Pattern) -

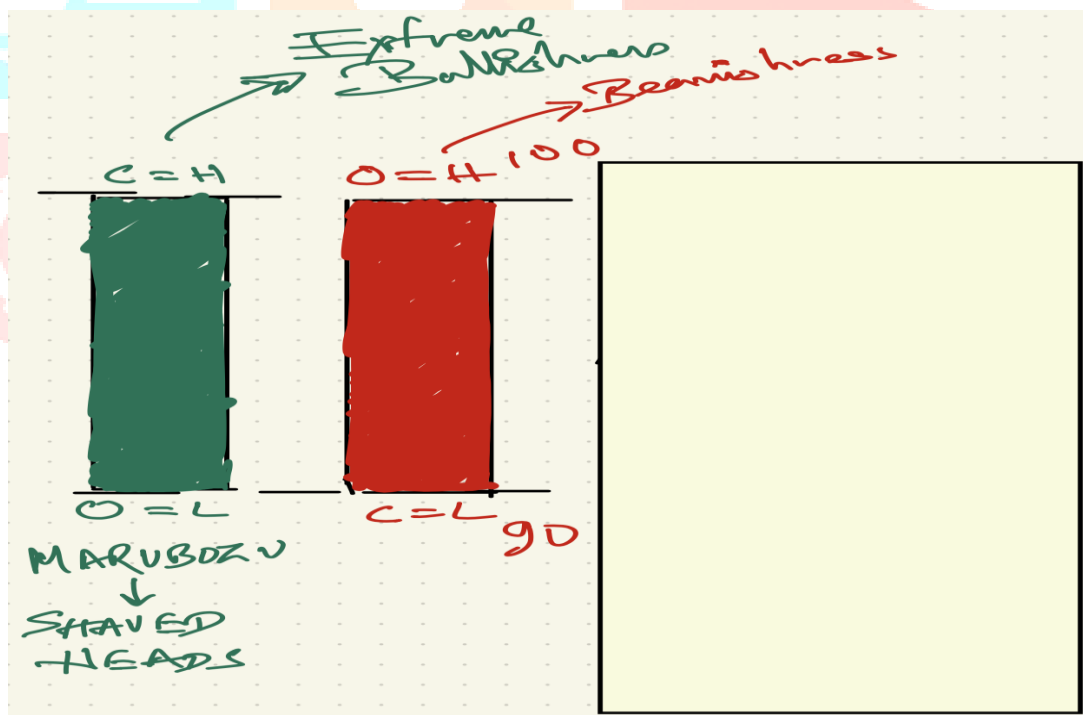


6. Descending Triangle (continuation pattern) -



Types of Japanese Candlestick Patterns used -

- 1. Bullish and Bearish Marubozu -



2. Hammer and Hanging Man –



3. Bullish and Bearish Engulfing Pattern -



Charts' analysis and interpretation for Motherson Sumi Systems Limited –

lakshbhatia published on TradingView.com, November 09, 2020 00:57:34 IST
 NSE:MOTHERSUMI, 1W 117.05 ▲ +4.50 (+4%) O:106.50 H:117.90 L:105.15 C:117.05



Chart A

In the chart 'A', '1' is the trendline which represents the downtrend. The Elliptical named as 'A' represents the pattern – 'The Hammer'. Since, the prior trend was a down trend and the pattern so formed was 'The Hammer', the stock price did increase for a while. The increment is represented by figure 'B'. The scrip was up by 36.47% (Rs. 34.60) in just three weeks. The pattern would have rewarded tremendously to investors.

lakshbhatia published on TradingView.com, November 09, 2020 01:09:53 IST
 NSE:MOTHERSUMI, 1W 117.05 ▲ +4.50 (+4%) O:106.50 H:117.90 L:105.15 C:117.05

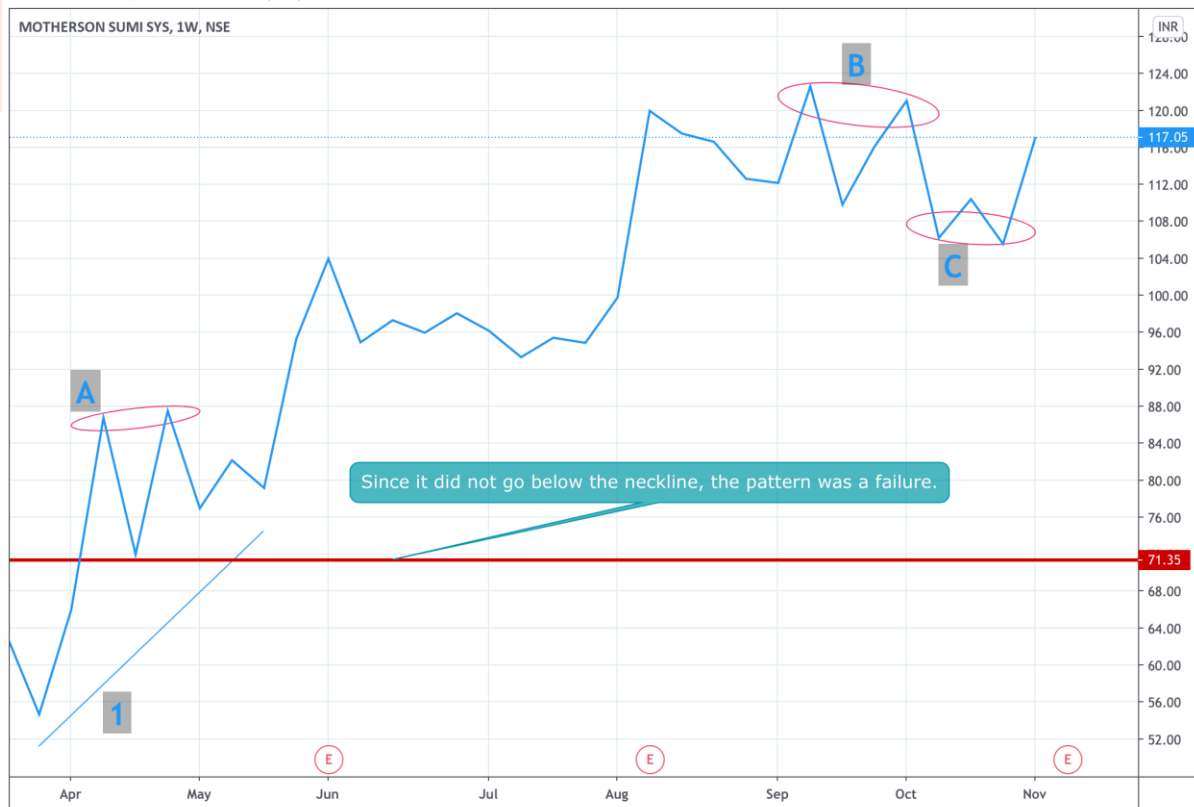


Chart B

In the chart 'B', '1' is the trendline which represents the uptrend. The Elliptical named as 'A' represents the 'Double Top Pattern'. The pattern was a failure since it did not break the neckline. Hence, it was a pattern failure. The elliptical named as 'B' was also not a pattern (Double Top Pattern) hence there was defined prior uptrend. Similarly, the elliptical 'C' cannot be considered as a 'Double Bottom Pattern' since the gap between the two lows was only that of a week (which is insignificant).

Charts' analysis and interpretation for WABCO India Limited –

lakshbhatia published on TradingView.com, November 08, 2020 04:05:05 IST
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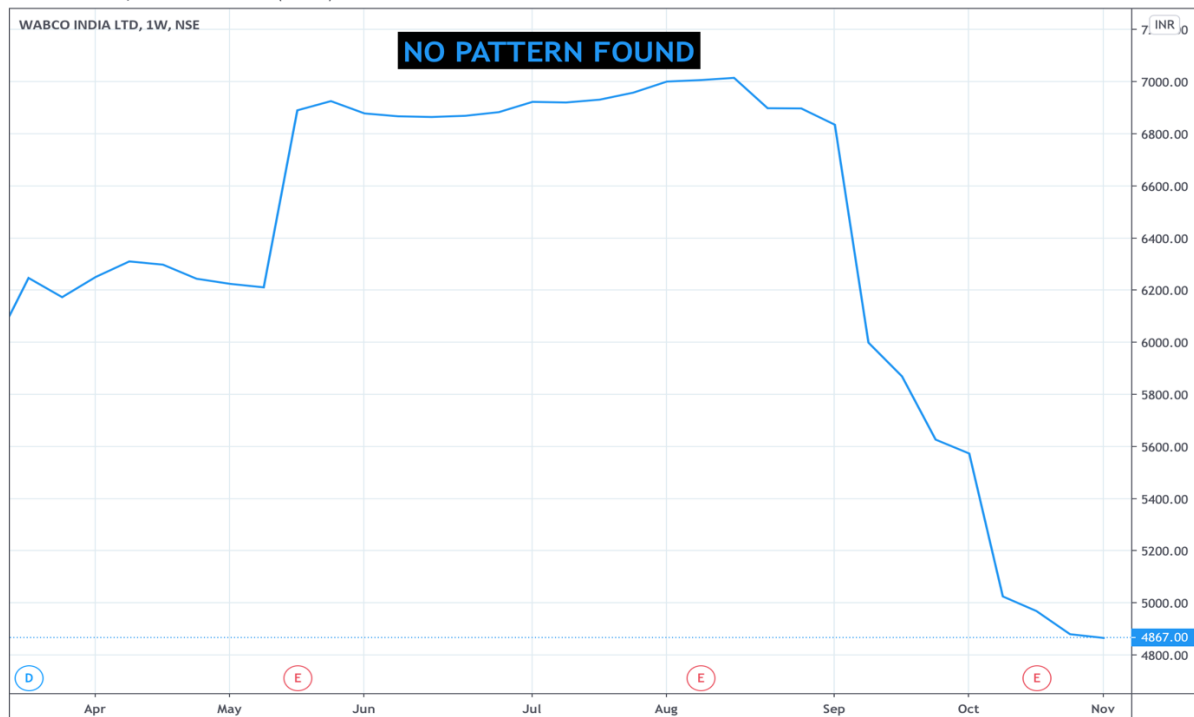


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Chart C

In the chart 'C', '1' is the trendline which represents the uptrend. The Elliptical named as 'A' represents the 'The Hanging Man'. The pattern was a failure since the prices did not go down. Instead, the security was trading mostly flat. Hence, a pattern failure.

lakshbhatia published on TradingView.com, November 08, 2020 10:06:38 IST
 NSE:WABCOINDIA, 1W 4867.00 ▼ -31.10 (-0.63%) O:4885.35 H:4990.95 L:4795.00 C:4867.00



TradingView

Chart D

There was no pattern found in this line chart, Chart 'D', for this security with regard to the time frame considered.

Charts' analysis and interpretation for Vinati Organics Limited –

lakshbhatia published on TradingView.com, November 09, 2020 01:58:26 IST
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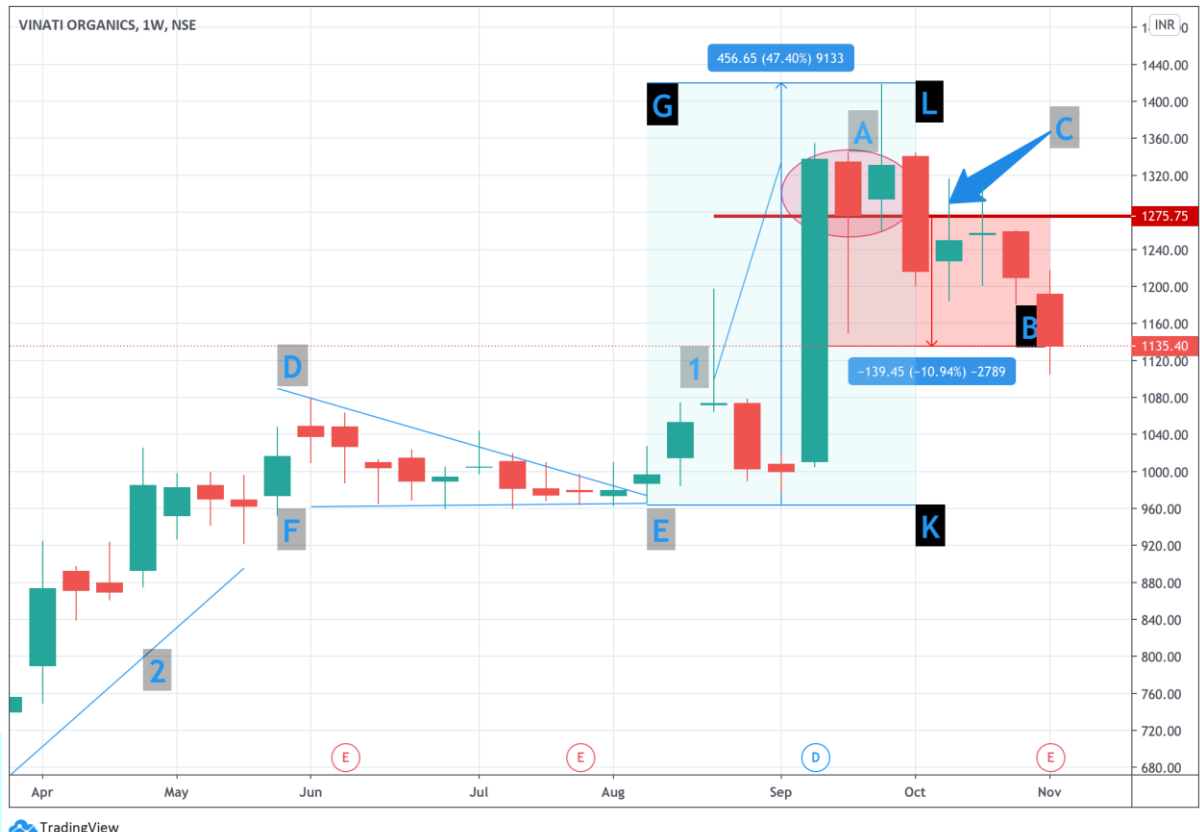


Chart E

In the chart above (chart 'E'), '1' is the trendline which represents the uptrend and so does trendline '2'. The Elliptical named as 'A' represents the pattern – 'The Hanging Man'. Since, the prior trend was an uptrend and the pattern so formed was 'The Hanging Man', the stock price did fall for a while. The decrement is represented by figure 'B'. The scrip was down by 10.94% (Rs. 139.45). The pattern would have rewarded tremendously to investors if they had shorted it. The triangle DEF is a descending triangle. It meant that the pattern (of uptrend) would continue and it did. The figure 'GLKE' represents the increment and the continuation of the uptrend. The scrip increased by 47.40% (Rs. 456.65).

lakshbhatia published on TradingView.com, November 08, 2020 09:40:08 IST
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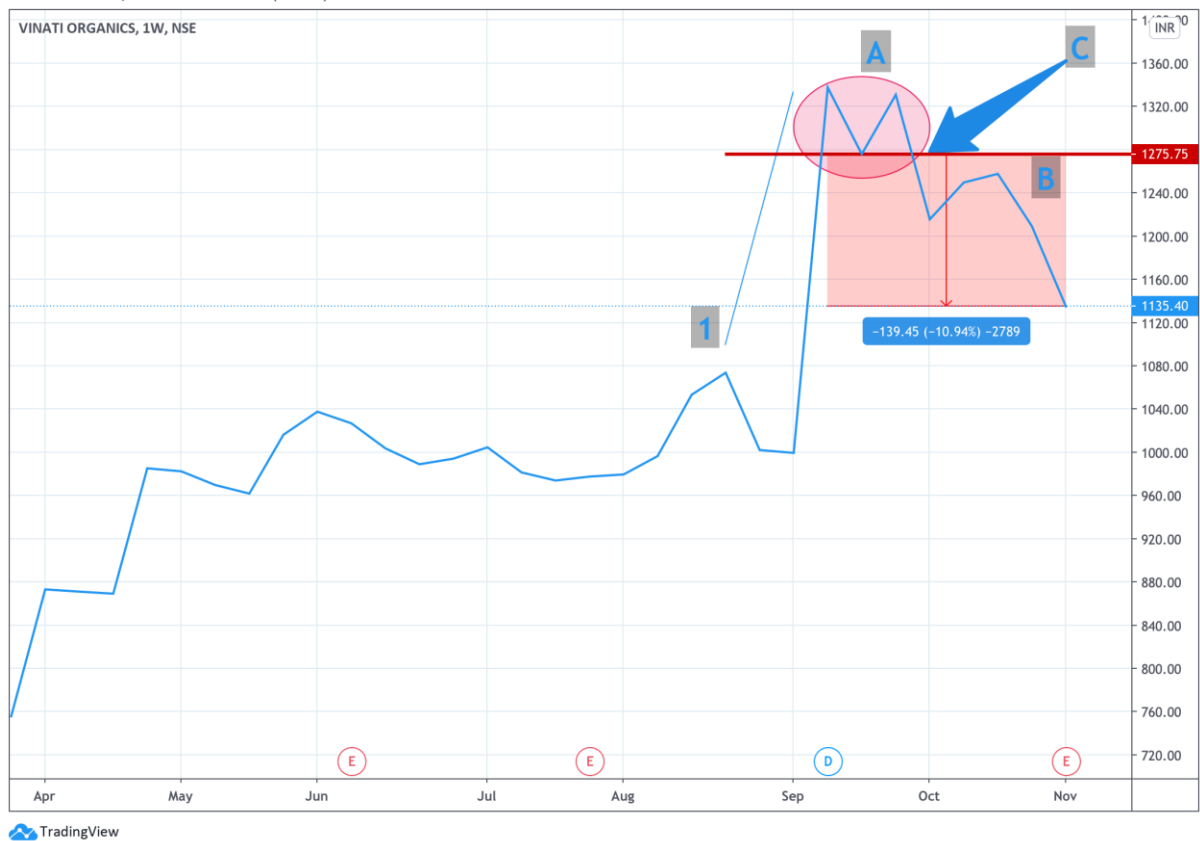


Chart F

In this chart 'F', the trendline is numbered as '1', which represents an uptrend. The elliptical named as 'A' is forming a 'double top pattern'. This meant a reversal for the uptrend and indicated a downtrend. After the price of Rs. 1275.75 (Arrow marked as 'C'), the scrip fell by 10.94% (Rs. 139.45). The figure B represents the downfall. It was a good opportunity for shorting the scrip for the investors.

Charts' analysis and interpretation for Godfrey Phillips India Limited –

lakshbhatia published on TradingView.com, November 08, 2020 20:03:19 IST
 NSE:GODFRYPHLP, 1W 881.95 ▲ +6.65 (+0.76%) O:901.45 H:901.95 L:861.05 C:881.95

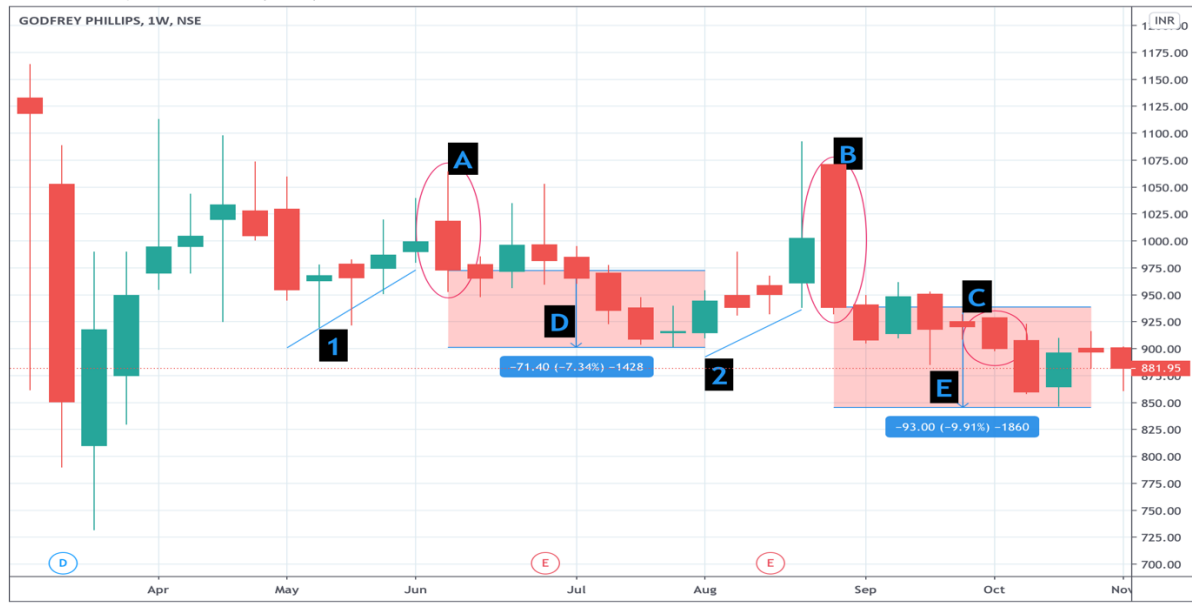


Chart G

In this chart 'G', the trendlines are numbered as '1' and '2' representing an uptrend. The figure 'A' forms the pattern of a 'Bearish Engulfing Pattern' indicating a downfall for the security. The figure 'D' represents the downfall. The scrip was down by 7.34% (Rs. 71.40). The figure 'B' represents the pattern of a 'Bearish Marubozu' indicating a downfall. The downfall is represented by figure 'E'. The scrip further fell by 9.91% (Rs. 93). Both of these opportunities had a great chance for short selling. The figure 'C' yet again represents 'Bearish Marubozu', signalling a green flag and approving the previous bearish marubozu (B).

lakshbhatia published on TradingView.com, November 08, 2020 19:32:20 IST
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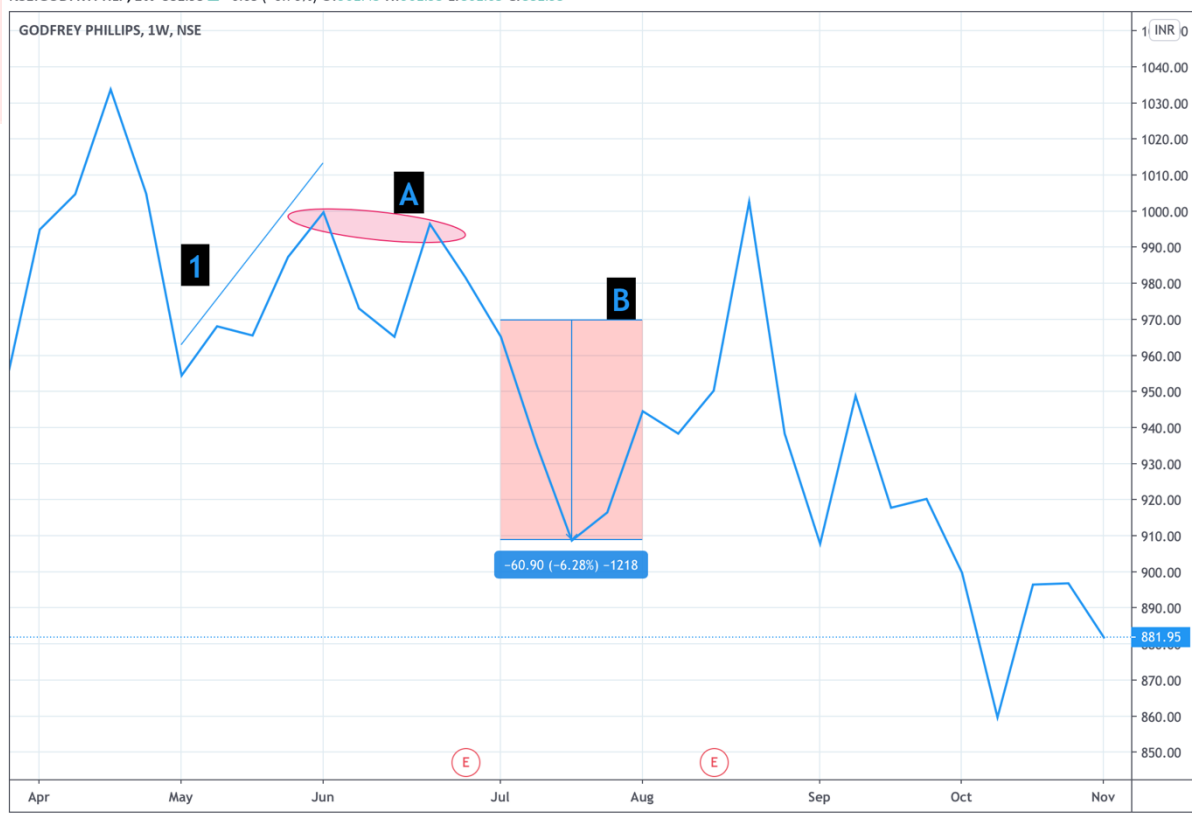


Chart H

In this chart 'H', the trendline represents an uptrend and is numbered as '1'. The figure 'A' forms a pattern which represents the 'Double Top Pattern' indicating a downfall for the security. The security did fell by 6.28% (Rs. 60.90), giving a shorting opportunity to the investors.

Charts' analysis and interpretation for Teamlease Services Limited –

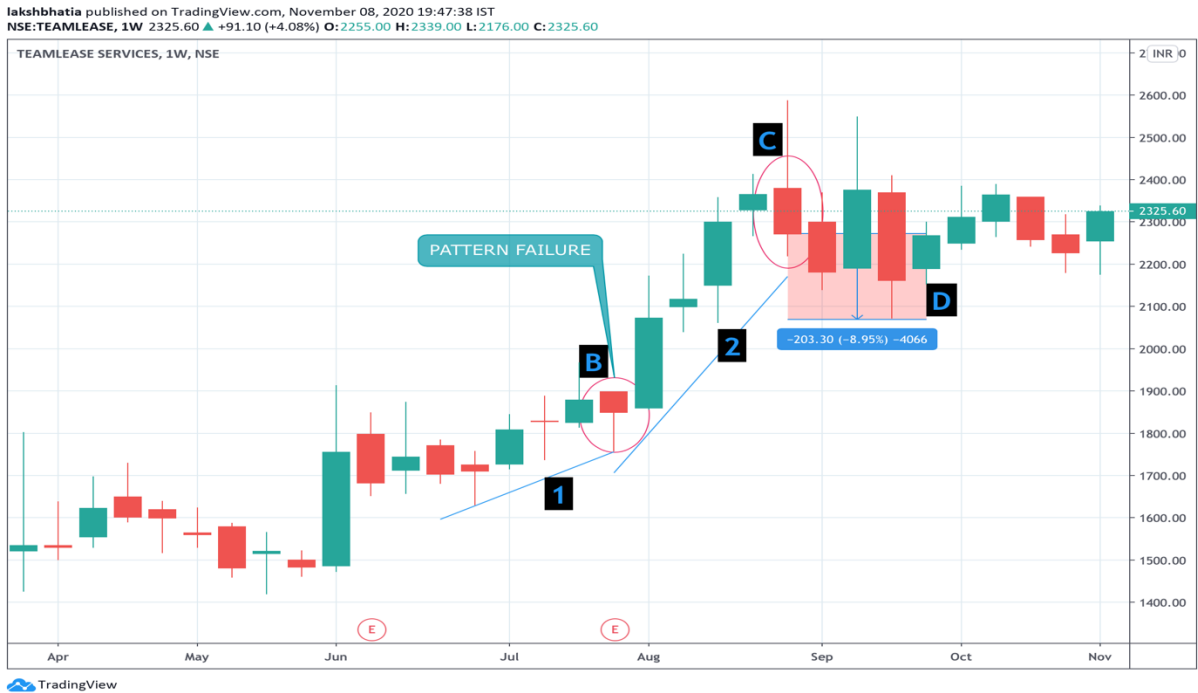


Chart I

In this chart 'I', the trendlines are numbered as '1' and '2'. Both of the trendlines represent an uptrend. The figure 'B' represents pattern of 'The Hanging Man'. Although the pattern was a failure since the prices did not go down, whereas they should have according to this pattern. The figure 'C' represents a 'Bearish Engulfing Pattern', indicating a downtrend for the scrip. The price fell by 8.95% (Rs. 203.30). The figure 'D' shows the area and extent of the price decrement.

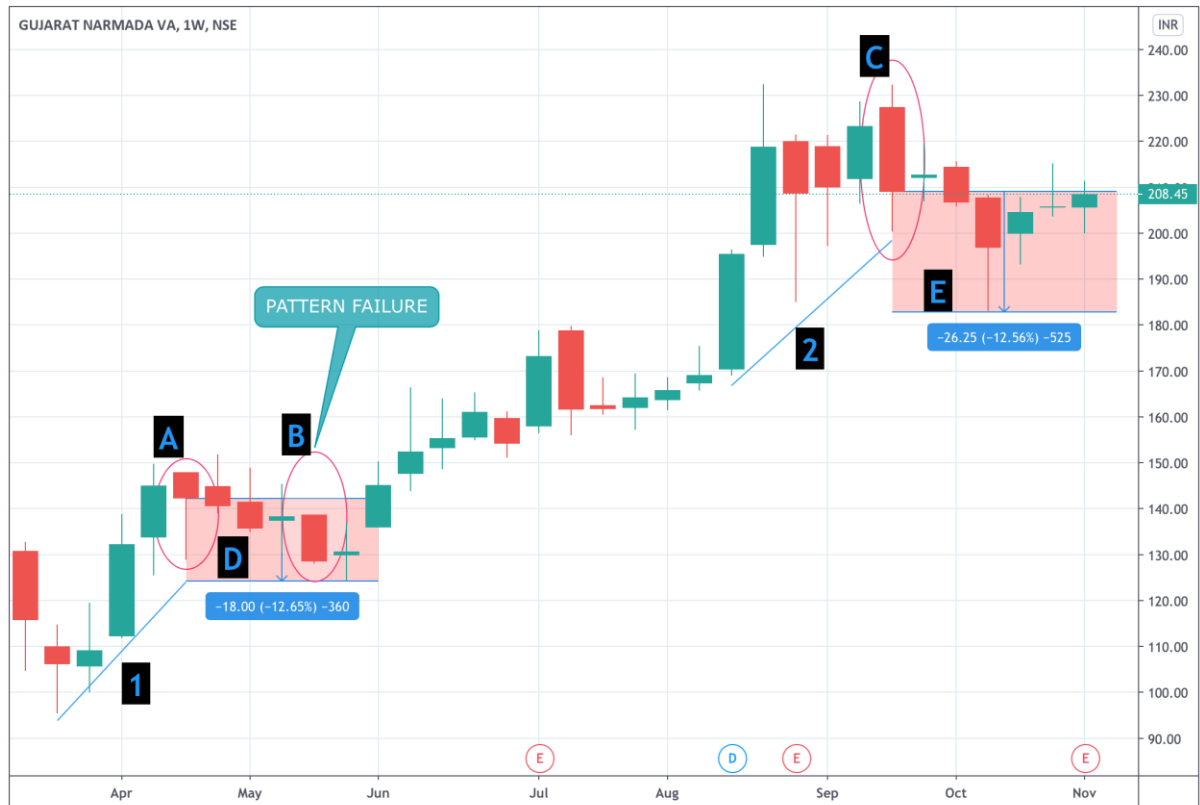


Chart J

In this chart 'J', '1' represents the trendline which indicates a downfall. The figure 'A' forms a 'Double Bottom' pattern. This meant a trend reversal indicating an uptrend. The figure B represents the performance of the security after the formation of the pattern. The scrip rose by a whopping 55.56% (R.s 845.55), yet another great opportunity for investors.

Charts' analysis and interpretation for Gujarat Narmada Valley Fertilizers and Chemicals Limited –

lakshbhatia published on TradingView.com, November 08, 2020 20:18:46 IST
 NSE:GNFC, 1W 208.45 ▲ +2.70 (+1.31%) O:205.75 H:211.45 L:200.05 C:208.45

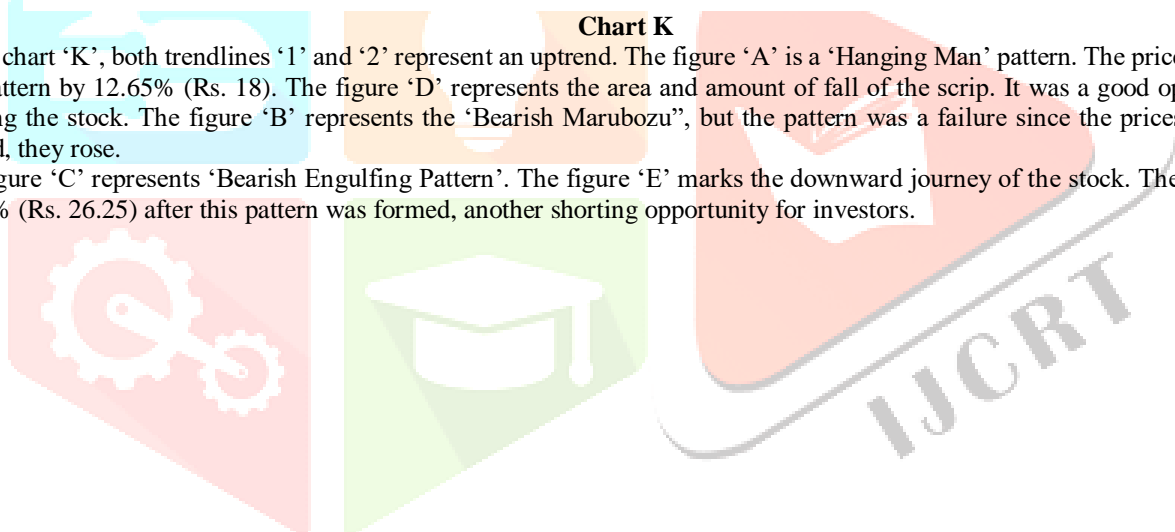


TradingView

Chart K

In this chart 'K', both trendlines '1' and '2' represent an uptrend. The figure 'A' is a 'Hanging Man' pattern. The price did fall after that pattern by 12.65% (Rs. 18). The figure 'D' represents the area and amount of fall of the scrip. It was a good opportunity for shorting the stock. The figure 'B' represents the 'Bearish Marubozu', but the pattern was a failure since the prices did not fall, instead, they rose.

The figure 'C' represents 'Bearish Engulfing Pattern'. The figure 'E' marks the downward journey of the stock. The stock fell by 12.56% (Rs. 26.25) after this pattern was formed, another shorting opportunity for investors.



lakshbhatia published on TradingView.com, November 09, 2020 00:40:50 IST
 NSE:GNFC, 1W 208.45 ▲ +2.70 (+1.31%) O:205.75 H:211.45 L:200.05 C:208.45



TradingView

Chart L

There was no pattern found in this line chart for this security with regard to the time frame considered.

Discussion and Conclusion

Table for the type and number of patterns formed

Pattern	Successful	Failure	TOTAL
The Hammer	I		1
Double Top	II	I	3
Hanging Man	II	II	4
Descending Triangle	I		1
Bearish Engulfing	III		3
Bearish Marubozu	II	I	3
Double Bottom	I		1
TOTAL	12	4	16

No patterns formed – II

Total patterns (excluding no patterns) formed- 16

So, a total of 16 patterns were found (of which 11 were Japanese candlestick patterns and 5 were classical patterns) in the sample considered for the purpose of study. It can be seen that the patterns had a success rate of 75% overall. If we classify the success rate of the patterns, Japanese Candlestick patterns had a success rate of 72% and the classical patterns had a success rate of 80%. The ‘Bearish Engulfing’ pattern was the most successful one as it was found 3 times and did not fail a single time.

On observation, it was found that the Japanese candlestick patterns were more prevalent than the classical price patterns as only 5 classical patterns were found and the number of that of Japanese candlestick patterns was 11. Also, the candlestick patterns so found were more successful in the smallcap companies than the midcap companies. The total patterns found existed more in number in smallcap companies than the midcap companies. A total of 10 patterns (including failures) were identified in the smallcap companies and 6 patterns (including failures) were found in the midcap companies.

So, the paper’s research objectives were -

- a. To determine the reliability of technical analysis using charting patterns (both, classical and Japanese candlesticks).
 - b. To test the reliability of such charting patterns on small and midcap companies.
 - c. To find the applicability of theory of charting patterns in practice;
- And hence it can be stated that they stand true and have been proved.

All in all, it can be concluded that the patterns had a success rate of 75% (either Japanese candlestick patterns or classical price patterns). Both reward tremendously to the investors, especially in the smallcap companies as the patterns found existed more in number in the smallcap companies and that the Technical Analysis using the charting patterns can be implemented in real life as they are reliable and can be rewarding, if observed, interpreted and entered into positions in time and correctly.

Limitations

Every research paper has a few limitations and so does this research paper. The following are the limitations of the paper –

1. Since the area of study (Technical Analysis) is subjective in nature, the paper, its observations, interpretations, conclusions, and the findings were based on the researcher's knowledge and point of view. The same pattern may not be identified as a pattern by the other person since there are no ground rules to any sort of pattern, be it classical price pattern or the Japanese candlestick patterns. Although, there are recommended shapes and time periods for the formation of the pattern, but there are no generalized, hard and fast rules to them. Also, the same pattern may not be as rewarding to the other person because of the difference in the timing of entry and exit during the trade. If a person either enters too soon/late in the trade or exits too soon/late, the trade may not be as rewarding as it would have been. It totally depends upon the analyst and his point of view.
2. The sample size of the study was limited to three (3) for each category – Midcap and smallcap companies. Since, a total of 157 companies existed in the midcap category and 239 in the smallcap category (which were the top 500 companies on the basis of their market capitalization as on 31st March, 2020), three observations per category might be a limitation to the study. More number of observations could have been taken, but keeping in mind the patterns considered, the time frame for the research paper, and the resources, three observations per category were deemed as suitable and fit for the purpose of the study.
3. Another limitation to the study is the fact that the time period considered for the purpose of the study was 6 months and the charts were taken on a weekly basis time frame. Although this does not mean that when charting patterns are used and observed for a time frame greater than that of 'daily', they do not work. They hold true for other time frames (weekly, monthly and yearly) as well.

Managerial Implications

With the research's objectives being proven true, experienced traders and even individuals who do not have much knowledge and time for the stock market can earn money and use the stock market as their extra source of income. This can be done if they learn even the basics of the stock market, technical analysis, and some pricing patterns. Practising on these charts (using the patterns) and trading on a simulator first (paper trading) will help them gain confidence and then they can identify and use these patterns in real life to earn extra income out of this. Learning this does not require a person to be very good with maths, geometry or anything else. It just requires observational skills and practice. Basic learning, constant practice of the identification of the patterns and timing the entry and exit of the trade will definitely reward the person. Hence, technical analysis and charting patterns can be relied upon and be used in the stock market as a means for generating secondary source of income.

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TECHNICAL ANALYSIS AND ITS USE IN THE STOCK MARKETS

Introduction

Technical Analysis is a type of study used by investors and traders to predict prices and take decisions accordingly. It can be defined as an art and science of forecasting future prices based on an examination of the past price movements. It is not an astrology for predicting prices. It is based on the analysis of market forces of current demand-supply of commodities, indices, stocks, or any other tradable security. It involves the plotting of information like prices, volumes, and OI (open interest, a term used in futures' trading) on a chart and then applying different patterns and indicators on that information in order to get an idea of direction of movement of the price of the security. Technical Analysis is used in various time frames, ranging from intraday (1 minute, 5 minutes, etcetera) to daily, weekly, monthly and years. Technical Analysis is one of the two methods (Fundamental Analysis is the other one) used for analysing investment decisions in the securities market. Technical Analysis is built on these premises –

1. Price discounts everything.
2. Price movements do not occur randomly
3. The 'what' is more important than 'why'

These theories were some of the few theories put by Charles Dow, a renowned American journalist, famous for his publications. Below is the explanation of the theories –

1. Price Discounts Everything – Analysts believe that the current market price of the security will reflect every possible material information which can have an impact (change and affect) on the price. Analysts believe that the stock will perform similarly in the future (under similar circumstances) as it had performed in the past.
2. Price Movements are not totally random – Technical analysis follows a principle of following the trend. Analysts believe that prices of securities do not change randomly. Rather, it follows a trend (uptrend or downtrend). Money can be made as the trend unfolds.
3. The 'what' is more important than 'why' – Technical Analysts should be concerned with only two things –
 - a. The current price
 - b. How the price behaved in the past

By focusing just on price and nothing else, it helps the analysts get a direct and unambiguous picture. As the price is the most important aspect for that is what will make the trader's trades profitable, the analyst should be concerned only and only with that.

The motivation for taking up this topic was that both of these, stock markets and technical analysis, are my areas of interest. I like to keep learning about the markets. Considering the scope of this field, if it (Technical Analysis) is combined with Fundamental Analysis, and Algorithmic Trading, it can do wonders. It is a topic which is very subjective because it is more like interpretation and prediction of prices, and varies from person to person.

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The data could have been compiled (and presented in the appendix) and the article would have looked more presentable. In the paper of J. G. Agrawal, D. V. (2013), the paper has presented only theoretical knowledge, and no kind of application on any security. The paper could have some more graphs or tables which would have made it more appealing.

Deepika Chandwani, M. S. (2014) in his paper makes the study more effective by adding another variable - Machine Learning along with some of the most prominent technical indicators. The RSI and MACD period considered by M.S.Ramaratnam, R. (2011) for the paper will affect the results of the study since the authors have chosen a period different from what is generally accepted as efficient and more resulting. The paper of IVANOV Mikhail, R. A. (2014) have made only theoretical findings and no application part of the knowledge. Also, Technical Analysis was not well explained as it should have been. The extent of knowledge given could have been better. In the paper of Wafi, A. H. (2015), an attempt has been made to find which is better - Fundamental or Technical Analysis, which is incorrect. Both of the subjects are different and are unique in their own. One cannot be better than the other because of their implications. The paper should have used technical tools for the study of technical analysis (it makes use of pure statistical tools). B. Sudheer Kumar, D. G. (2012) claims to make use of RSI and other technical indicators, but it does not. Also, what technical indicators will be used are not defined in the methodology as well. The charts could have been enlarged so that the reader has a better idea of them. In the paper of Dr.S.Kamalaravanan, (2018), SMA has been used as one of its tools, which in comparison to EMA, is inefficient. Better tools of technical analysis could have been taken. The paper of Ibrahim, H. S. (2017) tests the study using a period of 5 day for RSI, which is not a good choice. A period of 14 days (for RSI) is considered as ideal. The paper is full of tables, the data could have been presented in a more sophisticated way. After going through the paper of Dhole, D. (2017), it was observed that the paper has only theoretical findings, and that too, the explanation was not done in brief as it should have been. A more comprehensive and in-depth knowledge of the topics could have been provided. TALWAR SHALINI, P. S. (2019) describes the findings of the paper in a very good manner, and the paper makes good use of some well-known tools of technical analysis.

Research Gap
After going through all the research papers and articles, it was observed that the research projects were limited to the use of technical indicators (like Relative Strength Index [RSI], Moving Average Convergence Divergence [MACD], Bollinger Bands etcetera) and the companies chosen were mainly blue chip, large cap companies. This paper aims to fill that gap. The research paper will take into account the use of classical price patterns and Japanese candlesticks (a type of chart) of securities for predicting their prices, giving emphasis and importance to the small and midcap companies.

Research Methodology
Sample size - The sample for the purpose of the study of this paper has considered three companies which fall

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Types of Charts considered for the study - The paper uses the two types of charts which plot closing prices of securities at various times of intervals. The two types of charts which have been used are -

- A. Line Charts - Formed by connecting the closing prices of a stock over a given period of time.
- B. Candlesticks - These charts show the open, high, low, and closing price in a format which is identical to modern-day bar chart, but in a manner which shows the relationship between the opening and the closing prices. Different types of patterns are based on these charts.

Price Patterns - There are two types of price patterns used to identify trading opportunities in the secondary market -

1. Classical Patterns -
 - A. Continuation Patterns (continuation of previous trends)
 - B. Reversal Patterns (reverses a previous trend)
2. Japanese Candlestick Patterns

Types of Classical Patterns used for the purpose of the study-

1. Head and Shoulder Pattern (reversal pattern) -
2. Inverted Head and Shoulder Pattern (reversal pattern) -
3. Double Top Pattern (reversal pattern) -
4. Double Bottom Pattern (reversal pattern) -
5. Ascending Triangle (continuation pattern) -
6. Descending Triangle (continuation pattern) -

Types of Japanese Candlestick Patterns used -

1. Bullish and Bearish Marubozu -
2. Hammer and Hanging Man -
3. Bullish and Bearish Engulfing Pattern -

Data Analysis and Data Interpretation
Charts' analysis and interpretation for Motherson Sumi Systems Limited -

In the chart, '1' is the trendline which represents the downtrend. The Elliptical named as 'A' represents the pattern - 'The Hammer'. Since, the prior trend was a down trend and the pattern so formed was 'The Hammer', the stock price did increase for a while. The increment is represented by figure 'B'. The scrip was up by 36.47% (Rs. 34.60) in just three weeks. The pattern would have rewarded tremendously to investors.

In the chart, '1' is the trendline which represents the uptrend. The Elliptical named as 'A' represents the 'Double Top Pattern'. The pattern was a failure since it did not break the neckline. Hence, it was a pattern failure. The elliptical named as 'B' was also not a pattern (Double Top Pattern) hence there was defined prior uptrend. Similarly, the elliptical 'C' cannot be considered as a 'Double Bottom Pattern' since the gap between the two lows

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Charts' analysis and interpretation for Godfrey Phillips India Limited -
In this chart, the trendlines are numbered as '1' and '2' representing an uptrend. The figure 'A' forms the pattern of a 'Bearish Engulfing Pattern' indicating a downfall for the security. The figure 'D' represents the downfall. The scrip was down by 7.34% (Rs. 71.40). The figure 'B' represents the pattern of a 'Bearish Marubozu' indicating a downfall. The downfall is represented by figure 'E'. The scrip further fell by 9.91% (Rs. 93). Both of these opportunities had a great chance for short selling.
The figure 'C' yet again represents 'Bearish Marubozu', signalling a green flag and approving the previous bearish marubozu (B).
In this chart, the trendline represents an uptrend and is numbered as '1'. The figure 'A' forms a pattern which represents the 'Double Top Pattern' indicating a downfall for the security. The security did fell by 6.28% (Rs. 60.90), giving a shorting opportunity to the investors.
Charts' analysis and interpretation for Teamlease Services Limited -
In this chart, the trendlines are numbered as '1' and '2'. Both of the trendlines represent an uptrend. The figure 'B' represents pattern of 'The Hanging Man'. Although the pattern was a failure since the prices did not go down ,whereas they should have according to this pattern. The figure 'C' represents a 'Bearish Engulfing Pattern', indicating a downtrend for the scrip. The price fell by 8.95% (Rs. 203.30). The figure 'D' shows the area and extent of the price decrement.
In this chart, '1' represents the trendline which indicates a downfall. The figure 'A' forms a 'Double Bottom' pattern. This meant a trend reversal indicating an uptrend. The figure B represents the performance of the security after the formation of the pattern. The scrip rose by a whopping 55.56% (Rs 845.55), yet another great opportunity for investors.
Charts' analysis and interpretation for Gujarat Narmada Valley Fertilizers and Chemicals Limited -
Charts' analysis and interpretation for Gujarat Narmada Valley Fertilizers and Chemicals Limited -
In this chart, both trendlines '1' and '2' represent an uptrend. The figure 'A' is a 'Hanging Man' pattern. The price did fall after that pattern by 12.65% (Rs. 18). The figure 'D' represents the area and amount of fall of the scrip. It was a good opportunity for shorting the stock. The figure 'B' represents the 'Bearish Marubozu', but the pattern was a failure since the prices did not fall, instead they went up.
The figure 'C' represents 'Bearish Engulfing Pattern' which marks the downward journey of the stock. The stock fell by 12.56% (Rs. 26.25) after this pattern was formed, another shorting opportunity for investors.
There was no pattern found in this line chart for this security with regard to the time frame considered.
Discussion and Conclusion
Table for the type and number of patterns formed -
Pattern

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So, the paper's research objectives were -
a. To determine the reliability of technical analysis using charting patterns (both, classical and Japanese candlesticks).
b. To test the reliability of such charting patterns on small and midcap companies.
c. To find the applicability of theory of charting patterns in practice.
And hence it can be stated that they stand true and have been proved.
All in all, it can be concluded that the patterns had a success rate of 75% (either Japanese candlestick patterns or classical price patterns). Both reward tremendously to the investors, especially in the smallcap companies as the patterns found existed more in number in the smallcap companies and that the Technical Analysis using the charting patterns can be implemented in real life as they are reliable and can be rewarding, if observed, interpreted and entered into positions in time and correctly.
Limitations
Every research paper has a few limitations and so does this research paper. The following are the limitations of the paper -
1. Since the area of study (Technical Analysis) is subjective in nature, the paper, its observations, interpretations, conclusions, and the findings were based on the researcher's knowledge and point of view. The same pattern may not be identified as a pattern by the other person since there are no ground rules to any sort of pattern, be it classical price pattern or the Japanese candlestick patterns. Although, there are recommended shapes and time periods for the formation of the pattern, but there are no generalized, hard and fast rules to them. Also, the same pattern may not be as rewarding to the other person because of the difference in the timing of entry and exit during the trade. If a person either enters too soon/late in the trade or exits too soon/late, the trade may not be as rewarding as it would have been. It totally depends upon the analyst and his point of view.
2. The sample size of the study was limited to three (3) for each category - Midcap and smallcap companies. Since, a total of 157 companies existed in the midcap category and 239 in the smallcap category (which were the top 500 companies on the basis of their market capitalization as on 31st March, 2020), three observations per category might be a limitation to the study. More number of observations could have been taken, but keeping in mind the patterns considered, the time frame for the research paper, and the resources, three observations per category were deemed as suitable and fit for the purpose of the study.
3. Another limitation to the study is the fact that the time period considered for the purpose of the study was 6 months and the charts were taken on a weekly basis time frame. Although this does not mean that when charting patterns are used and observed for a time frame of daily, they do not work. They hold true for other time frames (weekly, monthly and yearly).
Managerial Implications

So, average uniqueness – 99.6% (498/5)
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