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A STUDY ON PROFITABILITY OF BULLISH REVERSAL CANDLESTICK CHART PATTERNS: WITH SPECIAL REFERENCE NIFTY IT SECTOR

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ABSTRACT

This study explores the reliability and profitability of bullish reversal candlestick patterns within the Nifty IT sector, a prominent segment of the Indian stock market. Utilizing daily trading data from April 2014 to March 2024, the research focuses on five primary bullish reversal patterns: Hammer, Inverted Hammer, Harami, Engulfing, and Morning Star. The analysis employs a rule-based methodology to identify and evaluate the success rate of these patterns across ten leading IT companies listed on the NSE.

The findings reveal that two-day candlestick patterns, specifically Harami, demonstrate the highest reliability with a success rate of 72.85%, followed by Inverted Hammer and Engulfing patterns. In contrast, single-day patterns such as Hammer and three-day patterns like Morning Star exhibit lower formation frequencies and success rates. The study underscores the significance of candlestick charting in technical analysis, particularly for short-term trading strategies, and provides a ranked assessment of the selected patterns based on their predictive accuracy.

This research aims to assist investors in the IT sector by identifying reliable candlestick patterns that can enhance decision-making and optimize investment outcomes. The results suggest potential future research directions, including the application of candlestick analysis to other market indices for broader validation.

Keywords: **Candlestick chart, Pattern, Bullish Reversal, Nifty IT, NSE.**

1. INTRODUCTION

Technical and fundamental analysis are the two main areas of financial market analysis. In contemporary financial market analysis, one of the most debated topics is the reliability of technical analysis (Hércules A. do Prado et al.2013), Numerous studies have demonstrated the dependability of technical analysis in real-world situations. Technical analysis is a chart-based study in the financial market. Plotting of price and volume data, including open, high, low, close, and the number of shares traded each day, is done in a graphical format to facilitate visual evaluation. The data is used by practitioners and traders to forecast the direction of securities prices and trading decisions in the future (Cohen, G.2020). Candlestick pattern is one of the essential instruments for technical analysis. The Japanese developed a technical analysis technique in the 1600s to evaluate the cost of rice contracts (Maradiya. A., & Alpa.J.2024). In current terminology, this method is known as candlestick charting. Candlesticks can indicate

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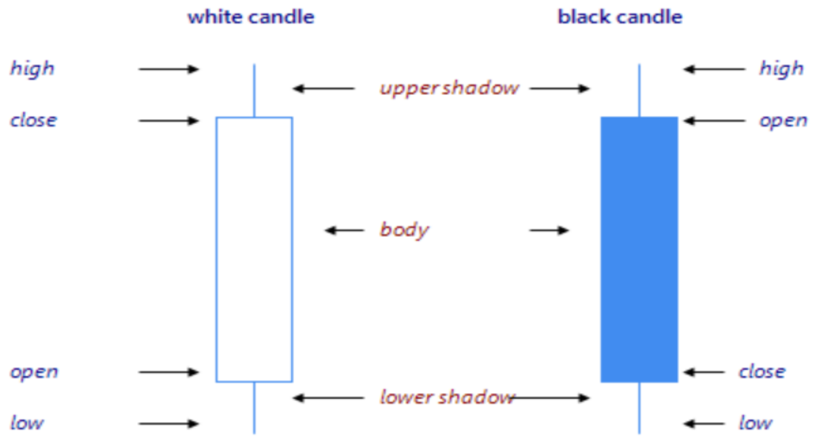
market dominance by sellers or buyers (Varadharajan.P & Vikkraman.P. (2011). Recent behavioural finance research has shown that investors do not always make logical decisions, which has improved the application of technical analysis strategies (Lu, T et al. (2012). Hence candlestick pattern is regarded to be leading indicator about the future trend of the market. This paper concentrates merely on bullish reversal pattern which have been disregarded by past researcher by investigate the profitability through the formation and success ratio of selected candlestick bullish reversal patterns in Nifty IT sector.

Candlestick charting

A Candlestick chart built from the open, high, low and close prices is shown below Figure 1. A white/green candlestick depicts a bullish signal, while a black/red candlestick represents a bearish signal. Reversal patterns usually give traders the opportunity to gain significantly on trend reversal signals by using the "buy low, sell high" strategy, while bullish continuation patterns provide continuous buying signals that motivate investors to hold their scrip longer before selling them at the best price to increase the probability of making a larger profit (Chee-Ling Chin et al 2017).

Figure 1: Single line Candlestick



Source: *From candlescanner*

2. LITERATURE REVIEW ANDTHEORITICAL FRAMEWORK

A key instrument in technical analysis is the candlestick chart. This technique reflects market sentiments like fear and greed by translating investor emotions into visual patterns on charts. It is commonly utilized in many programs, such as Microsoft Excel, which makes it available to traders. Numerous research works have investigated the efficacy of candlestick patterns. In particular, some studies have found that candlestick approaches are highly effective in some markets, while other studies have produced unsatisfactory findings (Lu.T. H.& Shiu.Y. M. 2012). The candlestick chart was initially developed in Japan, and it rapidly gained popularity

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all over the world. Investors frequently combine them with other technical indications. Candlestick proponents think that investors may benefit from these patterns by predicting short-term price movements or future reversal points (Eissa, A. M, et.al.2024). The candlestick chart pattern is most appropriate for the daily series, The reasoning is that, as compared to just intraday information, daily open and close prices would additionally take overnight data into consideration (Tharavanij, P, et.al.2017). Candlestick trading rules are not profitable for DJII component equities, and the candlestick charts provide less compelling evidence for the predictability of the stock market, For the largest stocks traded in the US market, trading on the signals produced by candlestick technical analysis does not add value (B R Marshall, 2006). When engulfing patterns are applied with the open and high criteria, they can accurately forecast short-term price moves. Like, the bullish pattern provides a strong short-term forecast when opening and lower are used (Jamaloodeen, M, et.al 2018). A sequence of candlestick lines is used to create reversal patterns, which show a significant possibility of trend changes. Trend reversal in the opposite direction is effective in assisting traders to buy at low and sell at high price for maximization of profit in trading. Bullish reversal pattern is evaluated to be more powerful in reflecting bullish signals as considerable gains are achieved (Chin, C. L, et.al 2016). Bullish candlestick is significantly more profitable than bearish candles, bullish reversal pattern are the best form of candlesticks, offering investors the highest mean rates of return. Bullish reversal candlestick always performs strong on 9^{th} and 10^{th} holding days (Goo, Y. J,et.al 2007). A single candle, hammer bullish reversal and an Inverted hammer has a bullish continuation, two-day candles Harami and Engulfing a bullish reversal, and three-day candles Morning Star and Three White Shoulder as bullish reversal. George Joseph, from his study, found a bearish engulfing and bullish engulfing pattern accuracy rate of 55% and a three-day candle dark cloud cover pattern with 100% accuracy (Romeo, A 2015). The harami pattern is the most successful trading method that has been tested on the Taiwan stock market. It highlights the significance of confirmation variables including the opening price following a pattern, the gap between real bodies, and volume changes. The two types of indicators used by technical analysis practitioners are mathematical and visual patterns, like candlesticks. Since visual patterns are thought to provide light on market behaviour, the majority of empirical studies has concentrated on patterns (Yung-Ming Shiu, & Tsung-Hsun Lu. (2011).
According to a review of the literature, very few studies have examined how candlestick chart patterns occur and how predictive they are for the IT industry. Therefore, the objective of our research is to examine how candlestick charts perform and form in the Indian IT industry (Eissa, A. 2024).

3. RATIONALE OF THE STUDY

Candlestick charts are one of the important tools that investors utilize in technical analysis to understand sentiment and market movement. After the amendment of budgeting 2024, investors and traders expect the IT sector will become the leading market player in the upcoming period. Therefore, the purpose of this study is to help investors in the IT sector with reliable candlestick patterns and how to make safer investment decisions (Sangondimath, A. S., & Kamashetty, S. B. (2022). The IT sector is one of the fastest-growing sectors with a rate of 15.6% compared with the Nifty 50 return rate of 14.3% in 2014-2024. The Nifty IT sector affords 21.6% return, and compared with Nifty 50 return rate of 28.6% 2013-2014 (NSE India).

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This study analyses the performance of candlestick patterns using the Nifty IT Index in an attempt to help investors in making investment decisions. The Nifty IT index comprises 10 IT companies listed in the NSE. The study's sample unit consists of the companies that were a part of Nifty IT as of June 3, 2024; these companies are listed in Table 1.

4. DATA AND METHODOLOGY

Data were collected from trading of the equity market in NSE. This study utilizes a vast data set of NIFTY IT index constituents leading benchmark index of IT ranging from April 2014 to March 2024. The stock price data used is daily Open, High, Low, and Close. Every stock has approximately 14600 raw data points. Input those raw data into Microsoft Excel and apply the rule of candlestick pattern formation.

Table 1: NIFTY IT Companies

ISIN Code	Symbol	Company Name	Date of Listing
INE591G01017	COFORGE	Coforge Ltd.	30-08-2004
INE860A01027	HCLTECH	HCL Technologies Ltd.	06-01-2000
INE009A01021	INFY	Infosys Ltd.	08-02-1995
INE010V01017	LTTS	L&T Technology Services Ltd.	23-09-2016
INE214T01019	LTIM	LTIMindtree Ltd.	21-07-2016
INE356A01018	MPHASIS	Mphasis Ltd.	04-06-2004
INE262H01021	PERSISTENT	Persistent Systems Ltd.	06-04-2010
INE467B01029	TCS	Tata Consultancy Services Ltd.	25-08-2004
INE669C01036	TECHM	Tech Mahindra Ltd.	28-08-2006
INE075A01022	WIPRO	Wipro Ltd.	08-11-1995

Source: Compiled by author

Table 1, Column 1 shows the ISIN code of respective company, column 2 shows the symbol of selected IT scrip in NSE, column 3 shows the top company name which represent the NIFTY IT, column 4 contains the Nifty IT companies date of listing in NSE India.

Pattern

The candlestick pattern that predicts the upcoming trend is known as a trend reversal. Furthermore, the reversal pattern was classified as either a bullish or bearish reversal pattern. In this study, the bullish reversal pattern was used for examination. Bullish reversal patterns imply an oncoming bull market. The purpose of this study is to see if the bullish reversal pattern on a candlestick can properly anticipate market movements. For this purpose,

Table 2: Candlestick Pattern

S. No	Pattern	Candles Formation	Pattern Type
1	Hammer	1	Bullish Reversal
2	Inverted Hammer	1	Bullish Reversal
3	Harami	2	Bullish Reversal
4	Engulfing	2	Bullish Reversal
5	Morning Star	3	Bullish Reversal

Source: Compiled by author

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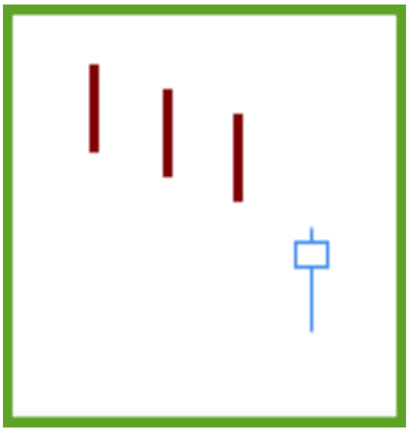
The study:

Figure 2: Hammer



Hammer belongs to the bullish reversal pattern. It is a constant single line pattern in a downtrend that looks like a lengthy candle. Prediction for the hammer pattern is Bullish reversal and prior trend was downtrend. Hammer is a White/green candle with a tiny body, has no upper wick or cannot be lengthier than the body and the lower wick could be two to three times longer than the body. The *Hammer* needs a confirmation within the next twice or thrice candles, during which the close prices should be higher than the close price of the pattern's body. The next candles need to validate the pattern. For instance, there might be an upward breakout of a trendline or resistance zone and a close above the pattern. If not, the pattern's appearance should be interpreted as a brief stop in the price decrease.

Figure 3: Inverted Hammer

The inverted hammer pattern is structure of two candles. Trend prior to the Inverted pattern consist of downtrend and prediction for the upcoming trend will be bullish reversal. First candle in a downtrend and appears black/red body. Second candle with a tiny body has no lower wick or the wick cannot be lengthier than the body, upper wick has at least twice to thrice times lengthier than the body. It has to be validated by breaking through the nearest trendline or

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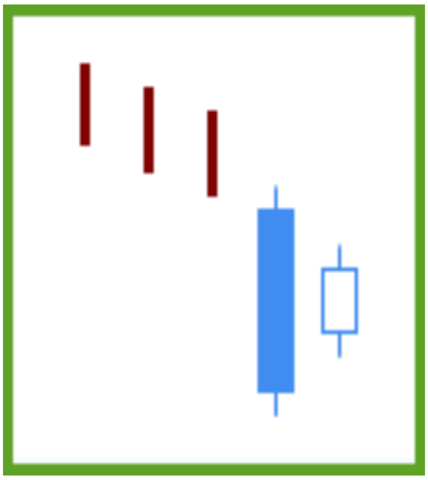
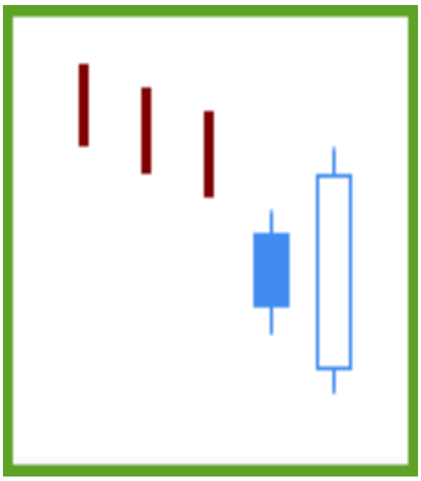
resistance zone. As usual, the pattern needs to be confirmed on the next candles, which means that the closest trendline or resistance zone needs to be suppressed.

Figure 4: Harami



Bullish harami is a two-line pattern which the initial candle is a red/black candle and the next candle is a green/white body candle. Harami previous trend pattern as formed in downtrend and the predicted trend will be bullish reversal. The pattern can be confirmed by break the closest resistance zone (The Bullish Harami pattern needs confirmation on the subsequent candles). In the circumstance that a candle that appears in the pattern closes below the second line's opening price, a downtrend is probably going to continue. On the other hand, there's a probability that the downtrend will be stopped if a candle that is following the pattern closes above its second line. When a Bullish Harami's initial line has a long black or red body, one should exercise caution because it could create a strong resistance zone.

Figure 5: Engulfing



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Bullish engulfing is a two-line pattern, the first line black/red candle's body is engulfed by the second candle's body as white/green. The wick's size does not matter, both on the first and second lines. The first candle's body can be black/red indicating a short line and the second candle can appear as a long line. The pattern indicates a downtrend and predicts its bullish reversal. Where on the chart a Bullish Engulfing appears is crucial. The candle pattern might only be a temporary respite before more market declines, depending on the circumstances surrounding the market. particularly if there is a significant resistance area above a bullish engulfing. If a bullish engulfing pattern forms, a support zone may form in the second line.

Figure 6: Morning Star

The *Morning Star* is a three-line bullish reversal pattern establishing in a downtrend. The initial candle is black/red indicating as a long line in a downtrend. Following candle can be white/green or black/red demonstrated as a tiny candle, The candle's body must be positioned below its previous body, that is the open and close prices must be lower than those of the prior candle.
The third line is a white/green candle indicating as a long candle, the open price must be placed above the previous candle. The candle needs to be close at least half up the body of the first candle (candles scanner).

To analyze the accuracy of the candlestick patterns' performance, the five specified candlestick patterns were chosen based on their popularity and frequency of appearance. In theory, when identifying the existence of patterns, the following conditions must be fulfilled:

- The Bullish reversal pattern is assumed to be formed only when observed in the downtrend, if it is formed in the uptrend then it is not taken into consideration.
- The market movement is to be assumed in an uptrend if it has a higher close price for a minimum of 3 days.
- A pattern reversal is treated to be successful if the current day close price is higher than the prior day close price

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5. ANALYSIS AND DISCUSSION

Table 3: Selected Pattern Number of Formation

Company name	Hammer	Inverted Hammer	Bullish Harami	Bullish Engulfing	Morning Star
COFORGE	16	245	167	83	6
HCLTECH	20	172	153	95	1
INFY	25	184	120	76	5
LTTS	12	163	93	69	5
LTIM	19	169	99	67	3
MPHASIS	18	242	178	86	3
PERSISTENT	23	194	142	98	4
TCS	24	169	149	83	3
TECHM	17	178	134	101	2
WIPRO	26	174	139	86	6

Source: Output from MS Excel

According to the study, the scrips INFO and WIPRO stock formed higher in the single line pattern hammer, while the LTTS stock formed lower. In the single line pattern as an inverted hammer, the COFORGE and MPHASIS stocks have the most pattern formations, while the LTTS stock has the fewest.

In the two-line pattern, the bullish harami has formed in a higher number of MPHASIS and COFORGE companies, but in a lesser number of LTTS and LTIM stocks. Bullish engulfing has a high number of formations in TECHM stock but fewer formations in LTIM and LTTS firms.

The morning star three-line pattern has a significant number of formations in organizations such as COFORGE and WIPRO; both companies have the same number of formations, while HCLTECH has very few formations.

Table 4: Ranking of Patterns

S.NO	Pattern	No. of Occurrences	Success	Failure	Success Rate (%)	Rank
1	Hammer	200	129	71	64.5	5
2	Inverted Hammer	1890	1348	542	71.32	2
3	**Harami**	**1374**	**1001**	**373**	**72.85**	**1**
4	Engulfing	844	591	253	70.02	3
5	Morning Star	38	26	12	68.42	4

Source: Output from MS Excel

- ‘Inverted Hammer’ is identified as the highest number of 1890 times and ‘Morning Star’ observed the least number of times as 38.
- The two-day candlestick pattern ‘Harami’ is ranked first with 1374 times of formation & success rate of 72.85% followed by ‘Inverted Hammer’ is ranked second with an

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18790 times formation & success rate of 71.32%, subsequently 'Engulfing' candlestick pattern as 70.02%.

- 'Hammer' is at the last position among the selected bullish reversal candlestick pattern with 200 times of formation & success rate of 64.5%.

The results of the study clearly reveal that the NIFTY IT index's two-day candlestick pattern is more reliable than the one-day and three-day candlestick patterns. Through the investigation, the NIFTY IT index One-day candlestick pattern hammer and three-day candlestick pattern morning star have fewer formations and a lower success rate than the two-day candlestick pattern.

6. Conclusion

Earlier studies attempted to improve the usefulness of candles by employing stop-loss strategies or technical indicators. In this study, we assess the effectiveness of candlestick chart patterns and offer the most profitable patterns in terms of ranking (Lu. T, et.al 2012). According to the data, two-day candles had the most formations, followed by one-day candles, and three-day candles had the fewest formations. Harami has the highest success rate when compared to the other candles. Candlestick charting has been reported to have an effective holding duration of 3-5 days [9]. Harami was chosen as the pattern with the best predicting ability due to its high success rate. Because the current study is limited to the NSE NIFTYIT index for assessing the usefulness of a specific bullish reversal pattern, it is proposed that future studies focus on different index markets to analyse the effectiveness of candlestick chart reversal patterns (Chin, C. L 2017).

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