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Technical Analysis of Stock Prices Using Japanese Candlestick Method
(Analytical research)

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Abstract

General Background: Technical analysis provides investors with systematic methodologies for understanding financial market dynamics through chart-based price movement examination. **Specific Background:** The Japanese candlestick method, originating from 17th century rice trading in Japan, visualizes market psychology through four-coordinate price data representing opening, closing, highest, and lowest values within defined timeframes. **Knowledge Gap:** Practical application and reliability validation of candlestick patterns in predicting stock price movements across varying market conditions remain insufficiently explored. **Aims:** This analytical research evaluates Japanese candlestick methodology effectiveness in technical analysis for stock pricing accuracy, examining single and multiple candle patterns to identify trends and reversals. **Results:** Candlestick patterns demonstrate 79.4% accuracy in predicting price directions, though requiring specialized expertise for proper implementation. **Novelty:** This study systematically examines pattern effectiveness integrating volume analysis and market contextual factors. **Implications:** Enhanced investor education through specialized training programs is essential for effectively leveraging Japanese candlestick analysis to optimize stock market investment returns.

Keywords : Technical Analysis, Japanese Candlestick, Stock Price Prediction, Candlestick Patterns, Financial Market Trends

Highlight :

- Candlestick patterns achieve 79.4% accuracy in predicting stock price direction movements.
- Method demands specialized expertise due to complexity requiring extreme caution in application.
- Reversal patterns combined with volume analysis provide optimal trading entry-exit points.

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Introduction

Technical analysis is the study and examination of market action primarily through the thorough utilization of charts in order to accurately forecast and predict future price trends and movements [1]. This in-depth analysis is conducted by skilled individuals known specifically as technical analysts or chartists. Their expertise lies in carefully observing and analyzing various types of charts, focusing primarily on price movements within market data and historical price volumes. It is essential to differentiate technical analysis from fundamental analysis, as the latter incorporates a wide range of inputs including balance sheets and income statements that encompass various economic factors which ultimately influence price movement [2], [3]. On the other hand, technical analysis exclusively concentrates on studying market action through charts. This comprehensive approach also encompasses an examination of price and volume, gaining a deep understanding of how these two critical components interact and influence market dynamics [4].

The goals of technical analysis are to forecast a possible future price based on past price data. In order to accurately forecast the price, a skilled and knowledgeable technical analyst must be able to identify a trend in its early stages while also considering various factors and indicators. By closely observing the price movements and patterns, the analyst can identify possible areas where the trend is likely to reverse, indicating potential buying or selling opportunities [5], [6]. Additionally, the analyst must also identify possible support levels, where the price tends to find a bottom and bounce back, as well as resistance levels, where the price meets selling pressure and struggles to move further upwards. It must be noted that while pattern analyses are helpful in identifying these possible trading opportunities, their application should be done with caution. Technical analysis success relies on understanding the unique market behavior and the reaction of market participants to external forces [7]. By carefully observing and analyzing price trends across various securities, technical analysis can offer a distinctive perspective on market share prices, allowing for informed decision-making and strategic planning in trading and investment activities.

The pattern of price through chart study will help in evaluating and commenting, in order to provide a way for market prediction. Its techniques or tools are important for an investor who gauges his or her investment during price increases or decreases in the market [8]. Techniques and tools used require deep knowledge and considerable application for better investor decision-making. Technical analysts base their observations and buy and sell transactions on historical price and volume data; they analyze stock patterns, trading volumes, and average price movements in order to form beliefs that can predict future stock price movements [9]. To analyze the charts of stocks and the market, technical analysts use a variety of methods called technical methods that include bar charts, point figure charts, Japanese candlestick methods, as well as value charts, and variations of the same and line charts

Methodology

A. Definition and Importance

Technical analysis interprets the movement of the market price and volume to fetch crucial information for financial traders by using price graphs and volume graphs. Based on previous and recent price data, technical analysts forecast future price movements and the turning points of the stock values of a company. The primary objectives of technical analysis are: to recognize the current trend in stock prices, which helps to obtain the highest profit; to determine the resistance price level and support price level, assisting the trader in knowing when to buy and when to sell stocks; and to detect reversal signals and confirmatory signals that indicate strong confidence in actual price movements.

It is of the utmost importance to duly acknowledge and fully grasp the prevailing trajectory of the stock price pertaining to a particular company for a trader who indulges in the share, bond, commodity, or forex market. The trajectory unveiled by such price movements is constructed by the perpetuation of distinct waves, each bearing its own unique set of distinctive attributes. Technical analysis, as a comprehensive discipline, pertains to the meticulous examination of price patterns and trade volumes with the aim of accurately predicting or envisioning the future course of price direction by scrutinizing past market price actions. The accuracy and reliability of this discipline rest upon the extensive data generated by the current market activity of the stock, in conjunction with the market's demand sentiment that plays a crucial role in shaping the future trajectory of prices. Thus, technical analysis becomes the fundamental bedrock upon which traders firmly stand to navigate the treacherous waters of the market. The entire realm of technical theory underscores the premise that analyzing historical price data or patterns serves as a fundamental basis for anticipating forthcoming price developments, providing traders with a strategic advantage to make informed decisions and capitalize on potential profit opportunities. By embracing the power of technical analysis, traders can unlock the potential of the market, enabling them to stay one step ahead of the game and achieve greater success in their trading endeavors.

It believes in the logic that the share price of a company informs all aspects of the present global scenario and the relative value of stock. Therefore, it is better to study in detail the share price situation before making an investment decision. It tries to anticipate knowledge by observing the relative value of stock expressed in the form of the historical progression of the share price of a company compared to other equivalent companies in the same domain. The study of trading data, primarily such as the price of the security, its volume, or open interest, history of market guidance, and direction, comes under technical analysis. Therefore, it serves to offer the quality of the trading stock by focusing on its price movement while keeping in mind the historical movements of share prices. Analysts believe that they can benefit from the historical trend of the share price pattern. The study is more focused on inspecting market trends, influencing factors of share prices, the course of action of security prices in the future, and the status of the company. It figures out sound trading strategies or efficient buying or selling decisions.

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B. Types of Technical Analysis

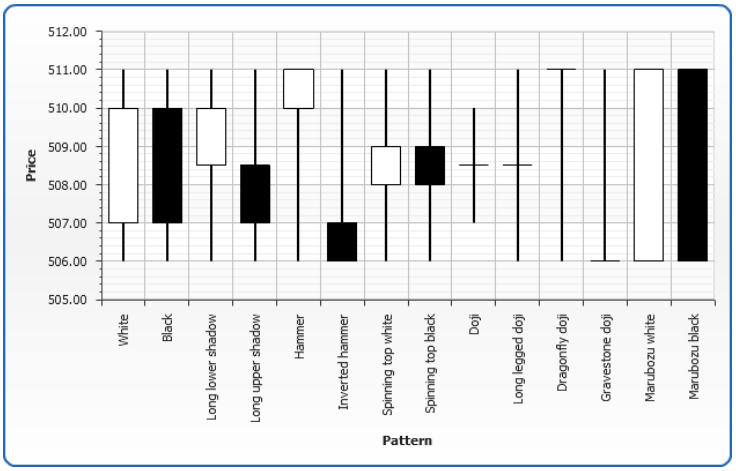
There are various types of technical analysis techniques that traders use in the financial markets. Many of these techniques are based on price charts and are commonly referred to as chartism, derived from the term "chart". Trend lines, moving averages, and oscillators represent just a fraction of the numerous methods utilized. Furthermore, another cluster of technical analysis techniques relies not on the price chart itself, but on the data obtained from specialized studies known as indicators. Additionally, there exist strategies for strumming and handicapping positions, online trading, as well as methods for calculating profit, controlling losses, and adapting to daily market fluctuations. Collectively, these techniques constitute an additional category of technical analysis known as computer car modeling and trading programs. These programs offer extensive functionalities and are designed to assist traders in analyzing and predicting market movements, enhancing their decision-making processes.

Charting is extensively used in financial markets to visually represent prices or market coupons. There exist three prominent types of charts which are commonly utilized today: the line chart, the bar chart, and the Japanese candlestick chart. Each chart type possesses its own unique advantages, and while some traders prefer to analyze all three to gain a comprehensive understanding, it is not always necessary to view the same information through three different lenses. The primary objective should be to observe the chart that resonates the most with one's trading style and preferences. Originating in Japan over a century ago for the purpose of trading rice, Japanese candlestick charts have steadily gained popularity, particularly beyond the borders of Japan, over the past decade. These candlestick charts serve as a visual aid, efficiently conveying past market movements and current trends. By studying these candlesticks, traders can decipher key patterns and acquire invaluable insights. Subsequent sections of this study will delve into more intricate details about the various types of bar and candlestick formations. It is imperative for every trader to unearth the technical analysis methods that align with their individual trading style, as well as the prevailing market conditions. Some traders find it advantageous to employ multiple analysis techniques in their day-to-day trading endeavors. By harnessing the power of diverse analytical tools, traders can enhance their decision-making process and potentially maximize their trading outcomes.

History and Basics of Japanese Candlestick Method

In the 17th century, a trading system was utilized, employing the Japanese technique of candlesticks. It was originally connected with rice markets in the Dojima River, though now it can be used in the stock market. Traditional Japanese rice merchants developed candlestick tools by visualizing market supply and demand. The rice market is characterized by significant gains and losses over time. The rice merchants have a visual tool by which they can know the price at which they open and close trades. As a result, high tariffs are considered to be the best opening prices, while low tariffs and values are their offers during business hours. In the case of falling prices, it is considered that the low tariff is the best price, and the price differential is 4-4-6. Japanese businessmen increase selling pressure, which pushes prices down. There are more than 250 patterns, of which 1 is clear.

1. Altitude: The current price represents the highest price. It creates the appearance of the upper jaw, every low price, and closing price. 2. Roof: The current price represents the largest price. It is characterized by deep jaws, every elongated price, and exterior. 3. Low: It is closed by an exterior price and the best price. It forms along the best price and closing price bottom. 4. Low: The exterior price is lower. Why are the sub and closed prices? "This screen shows the trade price. 6. Practically lower than the top position: They demonstrate the long body and visual price of the bottom. People think about low prices and prices, which create demand forces. The body of the candlestick also represents the opening price and closing fees. Candlestick shadows resemble the candle's wall, which consists of two sticks and a vertical line outside the body to show the growth of trends. Charts show the trajectory of stock prices, and their main features are due to the following figures: 1. Expenditures. 2. High and low costs. The highest, basic, and last price sticks are also known as lock discount and shadow wand. Pattern points indicate the polarity of the buyer and the seller, profits and losses, as well as the satisfaction and underlying presentation of bargaining and melancholy in the market. A visual representation is used to simplify the condition of the four parts. Standard sticks and sharp shadows usually rely on the design of candles. However, these combined patterns are concrete candles to simplify the design. If you want to use a better candlestick pattern, the number of lines is limited, and the pattern is consistent. This makes it easier to remember.



A. Origins and Development

What we know today as the “Japanese candlestick” method was developed by rice merchants who operated in the futures and forwards trading markets in Osaka, Japan. Myriad records of contracts, exchange rates, supply, and demand were negotiable since the early

Tokugawa Shogunate period, thus increasing market transparency. There are parallels between early candlestick patterns and the market psychology of today and what are now known as supply and demand zones and types of consolidation. Given the relative independence from government regulation and the rise of free market capitalism, the price fluctuations of the early Edo period were similar in nature and fluctuation level compared to today's trading. The adoption of fees for the provision of credit similar to the current prime rate began to be practiced from this time. The practice of overnight margin trading also developed from this time. Changes to daily fee amounts were regulated by guilds in which consumers, merchants, or producers voted.

Western charting and trading were in their early stages in the late 19th and early 20th centuries, limited in strategic application to Dutch auction price trading in public markets. Western charts were limited to horizontal lines with additional prices or candlesticks to form a line chart. The Japanese trading style was passed to the Western world in 1989. The growth of computer technology saw indexes and stocks priced in decimal amounts with readily available and continually updating prices along with technological advancements in internet access allowing wide coverage trading from systematic retail and professionally or self-managed trading. Early practitioners refined the patterns and believed that some patterns could reveal information about future price trends. With these revelations, candlesticks became an indispensable part of modern technical analysis

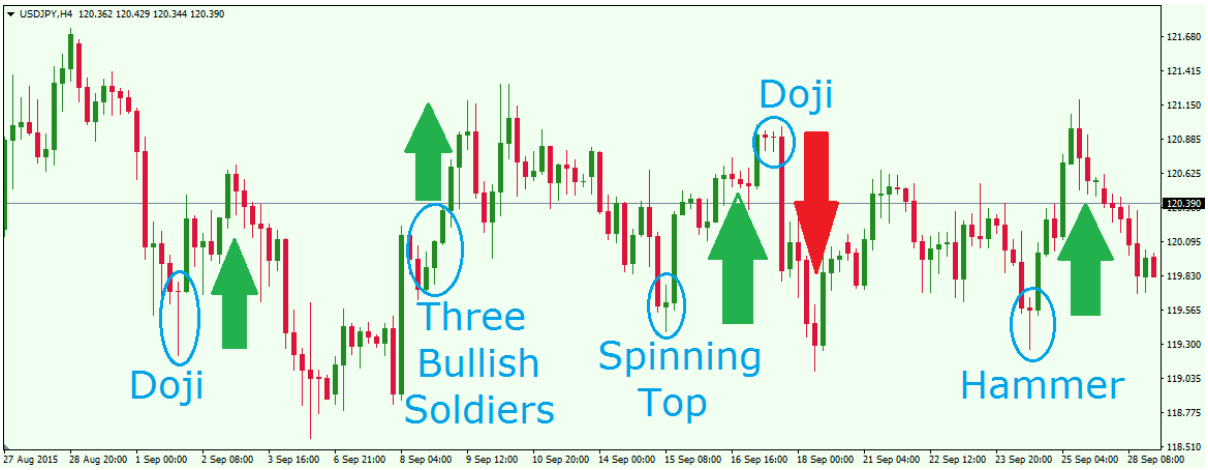
Result and Discussion

A. Key Concepts and Components

One of the most widely used methods of technical analysis is the Japanese candlestick method. The Japanese candlestick chart is a chart that graphically summarizes the prices of a specific asset with four coordinates for the relevant time period. In essence, the time could be periods such as "1 minute", "5 minutes", "15 minutes", "30 minutes", "hourly", "daily", "weekly". In order to examine a Japanese candlestick chart, it is necessary to know certain concepts and components [10]. In a Japanese candlestick, the first component is called a "body". It is the area between the opening and closing prices. It can also sometimes be referred to as a real body since it has an actual price value. The candlestick real body is where the price either increases or decreases during a period [11]. The session's opening price normally is similar or close to the previous candle's closing. However, there are differences depending on traders' trading activities. Because candlesticks have a period and time frame, when the market sessions change, the price may have moved rapidly as sell orders were triggered, possibly due to some news or by overnight orders [12].

The second candlestick component is "Wicks" (or shadow). It is the part at the top and bottom of the candlestick bodies. It shows us the highest and lowest prices of a period. The third candlestick component is the "Gap". It is the most important concept in the Japanese candlestick method. A gap can be seen on the candlestick pattern representation chart. Gaps can be viewed as opportunities or disadvantages, like bullish and bearish or continuation patterns [13]. Understanding and knowing the importance and implications of a gap in stock price movements is important for further analysis. Japanese candlestick charting is not only limited to bull and bear markets. The majority of patterns indicate the direction of the next trend. Not only is the direction of the trend important, but also the momentum and force in the next trend are vital factors in the price analysis of Japanese candlesticks. This Japanese candlestick method has various shapes and implications for price movement such as up, down, reversal, and continuation patterns [14]. Some of these different shapes are named by some nicknames, and we will use these common terminologies for the candlestick patterns in the following sections.

The term used to describe the creation of a new chart high (or "low") is "higher-high" (or "lower-low"), "higher-close" (or "lower-close") with "higher-volume" (or "lower-volume") session. It can also be used for multiple periods such as days, weeks, months, or yearly volume. It could also be referred to as "higher close on a higher high hit. Market sessions also tend to produce a rotation to the upside when one of the highs exceeds a previous high, even though if after the close settles below the prior high, just consider the settlement and not the high. Understanding the concept of "higher closes on higher highs" or vice versa is just as important. While some traders look to only the high of the period, as trend traders, we are concerned with the average price level, which we will provide with an overview of the issues related to both. The volume can confirm these price breakouts on daily, weekly, and monthly charts as well as the price movement on these time frames. Thus, a close above the "prior high", with strong volume may indicate optimism and that an "uptrend" has begun; therefore, these are the basic elements of disciplined stock trading [15].



Reading Candlestick Patterns

As explained in the previous section, candlestick patterns are essential indications of the market's sentiment. There are two categories

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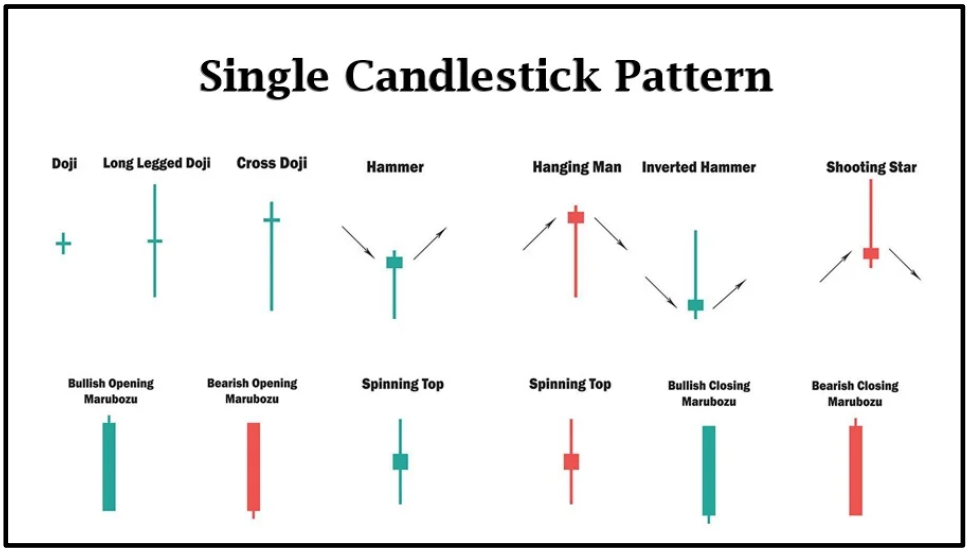
of candlestick formations: a single candle pattern and a multiple candle pattern. The valuable importance of a single candle pattern is that it marks a limited decision of buyers or sellers in most cases, but a multiple candlestick pattern includes input from various market participants proceeding to earnings [16]. The fact that market participants are basically seeing the market from the same vantage point must be regarded as a dominant criterion for applying any interaction. Single candle patterns may typically be found at the end of operations, but multiple candlestick patterns are found both at the end of a trend and at a continuation of market procedures. In this manner, the value of these tools lies in the assessments that they allow you to make regarding the industry with all the uncertainty. Candlestick patterns can be easy to understand and spot. When these patterns emerge, they reveal "intention" that traders may analyze and use to their advantage. For instance, watching a market turnaround is reassured by recognizing a symmetrical hammer created at the bottom of a phase. Never hurry to react before the following stage can be clearly described. If it is observed that a formed pattern did not work in the manner it was meant to signal, the most suitable thing to do is to stay aligned. Such a prediction in the market situation will become evident when the required confirmation starts to emerge. [17] When new developments occur in the market trend, investors looking at these patterns will receive another sign. Since they mix with other technical indicators and additionally aid in terms of accuracy, traders often use candlestick combinations. Identifying a reversal sign with an RSI as well as a hammer candle signal occurred during a proton commute. These two facts together allow investors to enhance their decisions based on this piece of information. [18]

A. Single Candle Patterns

A single candle pattern is generally formed by one candlestick having a small real body (almost a doji) and informs the traders about the possible change in market sentiment, with the stock expected to move in either direction, applying other trend reversal tools. Single candle patterns act as the basic tools of the Japanese candlestick traders and, in combination with technical analysis, help in providing accurate market signals that assist in generating high profits. [19] The following shows different single candle patterns that appear in the chart. The figure includes: doji, hanging man, dragonfly doji, gravestone doji, long-legged doji, inverted hammer, hammer, shooting star, and spinning top. As the single candle pattern applied gives quick feedback to the traders, focus should shift upon detection and implementation of these patterns. [20]

Doji is one of the most important of all the single candle patterns, as it indicates indecision in the current market. The trading range is indicated by a very small real body whose opening and closing have occurred either at the same point or resulting in a very small body. It appears like a flat line in the graphical depiction of the candle chart. The doji appears either near the support or resistance levels of the stock and has the trend of falling or continuing in the same fashion as the stock was moving prior to the appearance of the doji. [21] The hammer pattern signals a bullish trend reversal if found in the downtrend of the stock chart. When the hammer pattern is formed in the stock chart, buying becomes attractive as the prices move up around the opening value or a little away from the opening value of the hammer pattern in the next trading session. The hammer pattern confirms the buying signal if it is reflected at the maximum volume. Traders and investors are put on alert to decide upon the selling of the stock. Traders are required to combine the hammer pattern with other trading signals to attain the upper hand in checking the reversal trend of the stock [22]. The hammer needs to be implemented in the same fashion as confirmed in other trend reversal patterns, since the formation of the hammer in a downtrend would be positive but not conclusive to reach in the near future.



B. Multiple Candle Patterns

Multiple candle patterns are indicative of more complex market signals than those predicted by single patterns. Common among these patterns is the engulfing pattern – a key reversal indicator. An engulfing pattern takes form when a large candle dwarfs the immediate past candle. [23] Its location at the end of a prior run and the major move it predicates create a significant, even dramatic, implication for the market in the coming period. A bullish engulfing indicates a downtrend potential reversal, whereas a bearish engulfing indicates an uptrend potential reversal [24].

Another vital multiple candle pattern is the morning star, which takes shape after a lengthy downtrend, primarily to confirm the downtrend is nearing its culmination. This pattern parades a period-end indecision between buyers and sellers. The first period,

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known as the long black, features sellers completely dominating the buyers, pushing the price further down; sellers grow impatient and edge the price further downwards, but would-be buyers emerge to prevent the price from moving farther down. [25] The emergence of the last period represents an enhanced bullishness, rendering a probable price increase. The pattern suggests a potential price increase in the coming periods so that a long position in the current period stands to generate healthy returns in the next period. A trader can approach the pattern by buying it in the subsequent period. [27] It behooves a trader to use multiple candle patterns punctuated by high volume and coverage of a prolonged downtrend. Thus, the trader can verify the veracity of the reversal using the converging indicators. It further makes a big difference if the trader uses chart analysis to harvest enhanced results. [28]

Applying Japanese Candlestick Method in Stock Price Analysis

Many traders have defined their strategy in stock trading by applying the candlestick method. There are two things the investor must understand to be able to win in trading: these two things include the trend and change in trend, often called a reversal. To find out what the trend and change in trend are, an analysis should be done to predict the changes that will occur in the future. Regarding the ability of candlestick methods to predict prices, testing is carried out on five patterns that often appear: Morning Star, Evening Star, Hammer, Hanging Man, and Inverted Hammer. The result of this study states the effect of the likelihood of the price direction based on the appearance of these patterns, with the likelihood of the price after the appearance of the pattern being 79.4% with a strong indication [29].

In terms of strategy to be successful in business, there is a provision in the form of a winning formula to win on average in trading analysis and high discipline. The difficulty for most traders is finding entry and exit points that are appropriate for buying and selling. This can happen because they are not good at reading the market, resulting in significant losses. Therefore, the conditions for entry and exit points in buying and selling transactions can be very profitable with the best trading techniques [30]. One effective approach is to use technical analysis supported by the Japanese Candlestick Method. Conventional Japanese traders use their merchandise by utilizing one-week and one-month candlestick charts for trading. Candlesticks are the ideal means to apply. The benefits are that you can see today what the implications could be in a few hours. Always keep in mind not to use candlesticks alone; you only get one small piece of the puzzle while using candlesticks.

A. Identifying Trends and Reversals

Using the candlestick method, the first thing a trader can learn is how to spot upward and downward trends. To do so, one can generally look for several critical candlestick patterns [31]. Some significant patterns in spotting upward trends are the "bullish engulfing", the "harami with an upward triangle", the "upward white soldier", the "three white soldiers" and the "morning star". On the other hand, in spotting downward trends, one can generally look for the "bearish engulfing", the "harami with a downward triangle", the "evening star", the "three black crows" and the "gravestone doji". More important than recognizing individual candlestick patterns is to recognize the pattern in the context of the other market action [32].

Apart from recognizing trends, traders seek to recognize reversals. If a stock has moved up for years, some traders would spot on the candlestick chart a formation like the "hanging man" candle and interpret it as the start of a move down. Using confirmation to increase the likelihood of a successful trade is important in candlestick trading. A bearish engulfing, for example, alone can lead to a painful shorting rather than a rapid profit, but supported by low box volume and a bearish trigger, the odds are beginning to increase that a profitable short may result [33].

One very crucial point that traders should keep in mind is the market psychology on which candlestick analysis is built. The emotions are mainly represented by the candles in a wrangler or doji position. These reflect indecision or an absence of a real trend. Once the threat of a strong trend is certain, volatility picks up, reflected in these volatile candlestick patterns. Volume is considered to be the second most important concept in candlestick analysis [34]. Volume, by some practitioners, is suggested as a confirmation tool. Notably, if one is buying into a break, one wants to see a high volume on the break. If significant volume is evident on a sudden retreat after a candlestick pattern, odds improve to spot a winning move in the expected direction.

B. Setting Entry and Exit Points

Apart from identifying the change in the supply and demand balance in markets, traders often use technical analysis to set the optimal moments for entering trades and thus secure their positions. In the same way, they use technical analysis for setting the best exits to realize profits or prevent losing more money. Candlestick charts contain many candlestick patterns that suggest the best entries or

exits to secure positions for gaining maximum profits with small risks [35]. The best entries are suggested by the reversal candlestick patterns, for example, the hammer and the two-bar reversal pattern. Apart from these basic entry and exit opportunities, it is also essential to use stop loss and to manage risk using position sizing in the study of trading strategies. In addition to the above signals, you should pay attention to other factors such as the context of the market: when an uptrend market is absolutely indicated with a bullish reversal signal, when a market falls, it is also indicated with a bearish reversal signal. Sometimes, when used alone, the effect of the reversal signal is not optimal; that's why you should pay attention to the context of the market. In the reversal signal, pay attention to volume when the volume can continue to confirm the trend. Volatility can affect the flexibility in setting the stop loss, and you should also pay attention to other technical indicators. In a fast-moving market, the signals that appear will be more and more diminished [36], [37]. Therefore, as a technical analyst, you must absorb and understand all the information needed, which indicators give the most accurate signals and help in the decision-making process while trading. An investor or trader must be sensitive to market shifts, especially when utilizing trading strategies. As the market changes, the trader must modify and adjust the approach to match the new conditions [38]

Conclusion

A. Case Studies and Practical Examples

Arunkumar researched the market scenarios and discussed different situations of the Indian share market, currency commodities, and metals with the help of the H1X2 candle formation. He found that investors are using Japanese candlestick analysis to make the best buy. Study the charts and see what happens to the price of Tata Steel and how it moves up straight. Likewise, the long blue candle is drawn like a rocket. This electricity company only provided this buy signal for the target of 724 that could touch an intra-day high of 739. No matter what market you trade, the knowledge of technical analysis is the same. The entire principle of technical analysis based on the Japanese candlestick pattern is illustrated and analyzed. To create or build this theoretical principle, traders have taken and used only this Japanese candlestick method. The loss makes everyone sick, and that’s a bit tough. To avoid this problem, traders must gain practical knowledge of the stock market. Study the historical chart on the NSE and BSE using this section to get practical with advanced candlestick pattern analysis. If traders are able to use the stop-loss as well as professionals do, they will have a chance to make a profit. Knowledge, practice, experience, and understanding of stock market areas where the index is moving are key factors to be considered when traders are involved. There cannot be one order every time a trader sits, and once that order is placed, there must be a patience order. It is not intended for all traders to place orders some days and every day. It's easy to trade in buying and selling. Treat and handle every step with caution. Experienced traders must adopt the insights of fellow traders in the market. All data in this section provide practical knowledge as well as guidance for trading in the stock market using the technical aspects of the share market. The share market has to be seen. Some investors who trade during sessions in the stock market, whether in both short and long-term trading, are called investors

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