FMDB *Transactions on Sustainable Social Sciences Letters*

Decoding Batting Brilliance: A Comprehensive Examination of Rajasthan Royals' Batsmen in the IPL 2022 Season

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Abstract: This study scrutinizes Rajasthan Royals' batting performance in the IPL 2022 season, focusing on runs, boundaries, and sixes scored by the players. Analyzing match data reveals the pivotal role of specific batting orders in determining match outcomes. The findings underscore the dominance of the top-order batsmen in establishing solid foundations across Matches 1, 3, 5, 6, 7, 9, 11, and 12, contributing significantly to the total score. Conversely, the mid-order players showcased their impact in Matches 2, 4, and 8, consolidating and leading the scoring. Particularly noteworthy is the fact that the hitters in the lower order had little impact on the total score in each and every match, which is an indication of their difficulty in making significant contributions. These findings lend credence to the hypothesis that the top and middle-order batting performances in Indian Premier League cricket matches significantly determine the outcome of the matches. They also highlight the importance of having a strong and dependable batting line-up in order to achieve consistent success. The purpose of this paper is to emphasize particular match outcomes that are determined by the performance of various batting orders and to correlate these outcomes with the general conclusions of the study.

Keywords: Decoding Batting Brilliance; Examination of Rajasthan Royals' Batsmen; IPL 2022 Season; Foundations Across Matches; Modern-Day Cricket; Indian Premier League (IPL); T-20 Cricket League; Key Performance Indicators (KPIs).

Received on: 09/01/2023, **Revised on:** 29/03/2023, **Accepted on:** 21/05/2023, **Published on:** 05/12/2023

Cite as: W. Vinu, M. Al-Amin, R. A. Basañes, and A. Bin Yamin, "Decoding Batting Brilliance: A Comprehensive Examination of Rajasthan Royals' Batsmen in the IPL 2022 Season," *FMDB Transactions on Sustainable Social Sciences Letters*, vol. 1, no. 3, pp. 120–147, 2023.

1. Introduction

Performance analysis is evaluating the effectiveness and efficiency of a system, program, or process. It involves measuring and analyzing key performance indicators (KPIs) to determine how well a system performs relative to its goals and objectives. Performance analysis is used in various fields, including computer science, engineering, finance, and management. In computer science, performance analysis is used to measure and optimize the performance of computer programs and systems. This includes profiling the program to identify performance bottlenecks, analyzing its memory usage, and measuring its runtime performance. In finance, performance analysis is used to evaluate the performance of investment portfolios, mutual funds, and individual securities. This involves analyzing historical returns, risk metrics, and other performance indicators to assess the performance of these investments. In management, performance analysis is used to evaluate the performance of individuals, teams, and organizations. This involves setting goals and objectives, measuring progress towards those goals, and identifying areas for improvement. Overall, performance analysis is a critical tool for evaluating and improving the performance of systems,

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programs, and processes in various fields. Cricket is popular in many countries worldwide, especially in England, Australia, India, Pakistan, Sri Lanka, South Africa, and the West Indies. It is a bat-and-ball game that is like baseball in some ways but has many unique features.

Cricket aims to score more runs than the opposing team by hitting the ball with a bat and running back and forth between two sets of wickets, three wooden stumps with two bails balanced on top. Each team turns batting and fielding, and the game is played in innings, with each team getting a chance to bat and bowl. There are two main types of players in Cricket: batsmen and bowlers. The batsmen are responsible for scoring runs by hitting the ball, while the bowlers try to get the batsmen out by bowling the ball so that it hits the wickets or is caught by one of the fielders. Cricket has several forms, including test matches, one-day internationals, and T20 matches, each with its own rules and regulations. Cricket requires a lot of physical fitness, as players need to run quickly, throw accurately, and make sudden movements in the field. It is also a game that requires a lot of strategy and skill, as players need to be able to read the game and make split- second decisions based on the situation. Cricket is a challenging and exciting sport that millions worldwide enjoy. If you want to learn more about Cricket, many resources are available online and at your local sports club or community centre. Cricket is a bat-and-ball game that originated in England in the 16th century. The game evolved, and the first recorded match was played in 1646. Cricket became popular in England during the 18th century, and the first laws of the game were established in 1744.

Cricket was brought to other parts of the world through British colonization, and it quickly became popular in countries like India, Australia, South Africa, and the West Indies. The first international cricket match was played 1844 between Canada and the United States. Cricket continued to evolve, and the first Test match (between two national teams with official Test status) was played in 1877 between England and Australia. The first limited-overs cricket match was played in 1963, and this game format became increasingly popular, eventually leading to the creation of the World Cup in 1975. Cricket has produced some of the greatest sportsmen, including Sir Donald Bradman, Sachin Tendulkar, and Brian Lara. The game is played at the highest level in international competitions like the World Cup and the Ashes (a series played between England and Australia). It is also played at the domestic level in countries worldwide. In summary, Cricket is a bat-and-ball game that originated in England in the 16th century and has since become popular worldwide. The game has evolved, with the first laws established in 1744, the first test match played in 1877, and the first limited-overs match in 1963. Cricket has produced some of the greatest sportsmen ever and is played at the highest level in international competitions like the World Cup and the Ashes.

1.1. Modern-Day Cricket

Certainly, Cricket is a popular sport played worldwide and has evolved into the modern-day Cricket that we know and love today. In modern-day Cricket, there are three primary formats: Test cricket, One Day International (ODI) cricket, and Twenty20 (T20) cricket. Test cricket is the oldest form of Cricket, and it involves two teams playing against each other for up to five days. Each team has two innings to bat, and the team that scores the most runs for the game wins. As the name suggests, ODI cricket is a one-day version. Each team gets 50 overs to bat and bowl, and the team that scores the most runs at the end of the innings wins. T20 cricket is the game's newest format, quickly gaining popularity worldwide. In T20 cricket, each team gets 20 overs to bat and bowl, and the team that scores the most runs at the end of the innings wins. In modern-day Cricket, several rules and regulations have been introduced to make the game more exciting and competitive. For example, introducing the Decision Review System (DRS) allows teams to challenge umpire decisions, and technology has become more prevalent in the game. Additionally, fielding restrictions and power plays have been introduced in limited-overs cricket to make the game more attacking and high-scoring while encouraging teams to take risks and be aggressive. Modern-day cricket is an exciting and dynamic sport that continues evolving. As a physical education teacher, it is important to encourage students to learn about the rules and strategies of the game while also emphasizing the importance of teamwork, sportsmanship, and fair play.

1.2. T-20 Cricket League

T-20 cricket league is a shorter format of Cricket, where each team plays for a maximum of 20 overs. It was introduced in England in 2003 and has gained immense popularity. The T-20 format is known for its fast-paced and high-scoring nature, making it more exciting and entertaining for fans. In the T-20 cricket league, teams consist of 11 players, with one team batting and the other bowling. The goal of the batting team is to score as many runs as possible within 20 overs, while the goal of the bowling team is to restrict the opposition's score and take wickets. The T-20 cricket league is played in a league format, where teams compete against each other in a round-robin style competition, followed by a knockout stage for the top-performing teams. The league has various franchise-based teams that represent different cities or regions. Some of the most popular T-20 cricket leagues in the world include the Indian Premier League (IPL), Big Bash League (BBL), and the Caribbean Premier League (CPL). As a physical education teacher, it's worth noting that Cricket is a great sport for promoting physical fitness and overall health. Playing Cricket regularly can improve hand-eye coordination, agility, endurance, and cardiovascular health. In T-20 Cricket, players must be quick on their feet, have excellent reflexes, and maintain focus for long periods. Therefore, it requires a lot of physical and mental stamina to excel in this game format. In conclusion, the T-20 cricket league is an exciting

and fast-paced cricket format that has become popular worldwide. It provides an excellent platform for players to showcase their skills and talents while promoting physical fitness and overall health.

1.3. Indian Premier League (IPL)

The Indian Premier League is a professional Twenty20 cricket league established in India in 2008. The league is contested by eight teams representing different cities in India. Each team has a squad of Indian and international players who compete in a round-robin tournament followed by knockout stages to determine the winner. The IPL has become one of the biggest sporting events in the world, attracting millions of fans and generating significant revenue through ticket sales, broadcasting rights, and sponsorship deals. The league is known for its high-intensity matches, where batsmen aim to score as many runs as possible in the shortest possible time, and bowlers try to take wickets to limit the opposition's scoring. From a physical education perspective, the IPL offers a great opportunity to teach students about the importance of fitness, skill development, and teamwork in sports. Cricket requires a high level of physical fitness, including endurance, strength, speed, and agility, which students can aspire to achieve through regular training and practice. Moreover, Cricket teaches important life skills such as leadership, communication, and decision-making, which are valuable both on and off the field. As physical education teachers, we would encourage students to follow the IPL and learn from the strategies and techniques used by the players. We would also use Cricket to develop key physical education skills such as coordination, balance, and spatial awareness. Finally, we would stress the importance of fair play, sportsmanship, and respect for opponents, which are essential values in any sport.

1.4. Rajasthan Royals - History

The Rajasthan Royals team was founded in 2008 as one of the eight original franchises of the IPL. The team is based in Jaipur, the capital city of the Indian state of Rajasthan. The team is known for its blue and gold jersey, and its official mascot is a lion named Mooch Singh. In the inaugural season of the IPL, the Rajasthan Royals surprised everyone by winning the tournament under the captaincy of legendary Australian cricketer Shane Warne. They defeated the Chennai Super Kings in a thrilling final to lift the trophy. In subsequent seasons, the team did not perform as well and failed to reach the playoffs in the 2009, 2010, and 2011 seasons. However, they made a comeback in 2013 when they finished third under the captaincy of Rahul Dravid. In 2015, the team was suspended from the IPL for two seasons along with Chennai Super Kings due to a betting scandal involving team officials. They returned to the tournament in 2018 under new ownership led by businessman Manoj Badale. Since their return, the Rajasthan Royals have struggled to make an impact in the tournament. They finished fourth in the 2018 season but failed to qualify for the playoffs in the 2019 and 2020 seasons. The team has had several notable players, including Shane Watson, Ajinkya Rahane, Steve Smith, Sanju Samson, and Ben Stokes. They play their home matches at the Sawai Mansingh Stadium in Jaipur. In conclusion, the Rajasthan Royals are one of the original franchises of the IPL and have had a mixed history in the tournament. They won the inaugural season under the captaincy of Shane Warne and have had some notable players over the years. However, they have struggled to make an impact in recent seasons and will be looking to bounce back in the upcoming IPL season. The Rajasthan Royals is a franchise cricket team representing Jaipur in the Indian Premier League (IPL). The team was one of the eight founding members of the IPL and won the tournament's inaugural edition in 2008.

1.5. Rajasthan Royals - Present

As of my knowledge cut-off of September 2021, the Rajasthan Royals finished in the 5th position in the IPL 2021 tournament. In the 2021 season, Sanju Samson led the team with a mix of experienced and young players, including Jos Buttler, Chris Morris, Shivam Dube, and Chetan Sakariya. The Rajasthan Royals have had a mixed performance in the IPL in recent years, with their last playoff appearance coming in 2018. However, the team has always been known for promoting young talent and giving opportunities to lesser-known players. The team is owned by Manoj Badale's company, Emerging Media, and has a strong fan base in Rajasthan and other parts of India. Overall, the Rajasthan Royals have been a competitive team in the IPL and have the potential to perform well in the upcoming seasons with their young and talented squad.

1.6. Rules and Regulations

The Indian Premier League (IPL) is a professional Twenty20 cricket league in India, consisting of franchise teams representing different cities in India. Here are some of the basic rules and regulations of IPL T20:

- Teams: There are currently eight teams in the IPL, and each team can have a maximum of 25 players.
- Format: The IPL T20 tournament is played in a round-robin format, followed by playoffs and, ultimately, a final.
- Overs: Each team plays a 20-over innings. A bowler can bowl a maximum of 4 overs in an innings.
- Powerplay: The first six overs of each inning are called the powerplay, during which only two fielders are allowed outside the 30-yard circle.
- Fielding restrictions: Five fielders are allowed outside the 30-yard circle at any time after the Powerplay.

- No-balls: A delivery is deemed a no-ball if the bowler oversteps the front crease or the ball bounces more than once before reaching the batsman.
- Free hits: If a no-ball is called for overstepping, the next delivery is a free hit, which means the batsman cannot be out except by a run-out.
- Run-outs: If a batsman is out of his crease while the ball is in play, and the wicketkeeper or fielder dislodges the bails with the ball, the batsman is out.
- Dismissals: Batsmen can be dismissed in various ways, including bowled, caught, run out, stumped, and leg before wicket (LBW).

Points system: Teams are awarded 2 points for a win, 1 point for a tie or no result, and 0 points for a loss. The BCCI reintroduced the IPL 2011 playing format after confirming that the IPL 2022 would include ten teams. Seventy-four matches, including four playoff matches, will be played. As previously stated, the eight clubs will play 60 total matches, with each side playing 14 league matches and facing each other twice in the league. In 14 league matches, clubs will play seven at home and the rest away (which might be the opponent's home stadium). With the addition of two more clubs to the competition, maintaining home-field advantage appears to be a challenge.

1.7. Indian Premier League – Auction

The IPL Auction is an annual event where teams participating in the Indian Premier League (IPL) bid for players to form their team for the upcoming season. The auction is typically held a few months before the start of the IPL season and is conducted by the Board of Control for Cricket in India (BCCI). In the auction, each team is given a fixed budget to bid for players in different categories, such as batsmen, bowlers, and all-rounders. The players are categorized based on their performance in previous seasons of the IPL and other domestic and international cricket tournaments. The auction is conducted in a round-robin format, with teams taking turns to bid for players. The team that makes the highest bid for a particular player wins the bidding war and acquires the player for their team. The bidding continues until all the available slots in each team's squad are filled or until the teams exhaust their budget. The IPL Auction is an important event for cricket fans worldwide as it provides an opportunity to see some of the world's best players compete against each other in a high-intensity tournament. It is also an opportunity for young and upcoming players to showcase their skills and potentially earn a lucrative contract with one of the IPL teams. Rajasthan Royals have been known for their focus on promoting young Indian talent, so they may continue with this strategy in the upcoming auction. However, they may also look to sign experienced international players who can bring a wealth of knowledge and skill to the team. It remains to be seen who they will target, but we can expect the team to be active during the auction as they look to build a strong squad for the 2022 season.

2. Statement of the Problem

The study aims to analyze the performance of Rajasthan Royals in the 2022 Indian Premier League T-20 franchise.

Hypothesis

- It was hypothesized that the contribution of top-order batters leads to a pathway to win the match.
- It was hypothesized that the top-order batters contributed the most in failed matches.

Delimitations

- The study was delimited only to Rajasthan Royals' batters' performance analysis.
- This study only analyses the performance of the Rajasthan Royals team batters in the IPL franchise in 2022.
- This study was conducted only with IPL T-20 players.

Limitations

- This study does not include players' training periods.
- Certain factors were not analyzed, such as playtime, weather conditions, officiating, substitution, injuries, suspensions, and players' expulsions.
- Factors like diet, environment and lifestyle were not taken into this study.
- This study was based on the data collected from internet sources.

2.1. Significance of Study

- This study's findings may help coaches allocate the order of batsmen.
- This study may help to plan the modern strategy for improving the batting style.
- This study will reveal the reasons for victory.
- This study may help generate a workout plan to improve batting performance.

3. Definition of Terms

3.1. Performance Analysis

Performance analysis evaluates the effectiveness and efficiency of a system, program, or process. It involves measuring and analyzing key performance indicators (KPIs) to determine how well a system performs relative to its goals and objectives. Performance analysis is used in various fields, including computer science, engineering, finance, and management. In computer science, performance analysis is used to measure and optimize the performance of computer programs and systems. This includes profiling the program to identify performance bottlenecks, analyzing its memory usage, and measuring its runtime performance. In finance, performance analysis is used to evaluate the performance of investment portfolios, mutual funds, and individual securities. This involves analyzing historical returns, risk metrics, and other performance indicators to assess the performance of these investments. In management, performance analysis is used to evaluate the performance of individuals, teams, and organizations. This involves setting goals and objectives, measuring progress towards those goals, and identifying areas for improvement. Overall, performance analysis is a critical tool for evaluating and improving the performance of systems, programs, and processes in various fields.

3.2. Performance Analysis of Sports

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3.3. IPL-Auction

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4. Review of Literature

Petersen et al. [1] analyzed team, batting, and bowling performances in the 2008 Indian Premier League Twenty/20 Tournament to determine the key performance indicators influencing team strategy and cricket tactics. The study found that winning teams took more wickets, had a higher run rate, faced fewer dot balls, and scored more runs from 25+ run partnerships. The study recommends that team tactics focus on wicket-taking bowling and field placements in the first and last six overs and run restrictive field placing and bowling in the middle eight overs.

Petersen et al. [2] analyzed team performance in the 2007 ICC Cricket World Cup Tournament to determine key performance indicators and their importance in team strategy and tactics. The study found that the two most highly correlated performance indicators with winning in the tournament's later stages were taking wickets and run rates. The importance of hitting sixes decreased as the tournament progressed, while the importance of bowling maiden overs increased. Winning teams had more wickets and 50-plus partnerships while maintaining a higher run rate by hitting a higher percentage of runs in boundaries. The study recommends that team selection prioritize players who can deliver these objectives.

Douglas & Tam [3] discuss how the emergence of Twenty20 cricket has caused Cricket to evolve in recent years. The study examines the variables associated with success in the recent Twenty20 World Cup, including batting, bowling, and fielding. The study finds several moderate or large differences between winning and losing teams to these variables. The top five indicators for success in the tournament were losing fewer wickets in the game, losing fewer wickets in the powerplay while batting, scoring more runs per over, scoring more runs in the middle eight overs, and bowling more dot balls. The article concludes that teams should focus on taking wickets, bowling dot balls, and implementing tactics that encourage partnerships and boundary-hitting batsmen while batting to achieve overall success in Twenty20 cricket.

Moore et al. [4] looked at performance indicators in T20 cricket and found that taking wickets, especially in the last six overs, and scoring runs quickly through boundaries are key factors in winning matches. The pitch-level analysis also revealed that successful bowlers from winning teams had more wickets through LBW decisions. The study suggests mapping performance indicators across different playing conditions could help teams make better tactical decisions.

Irvine & Kennedy [5] aimed to identify the performance indicators that significantly affect the outcome of international T20 cricket matches worldwide. The analysis of 40 matches from 2012 to 2016 in seven countries revealed that the total number of dot balls, total number of wickets taken, and innings run rate were the most significant indicators of success across the four environments. The study suggests that teams should select wicket-taking bowlers, captains should gamble with attacking fields, and aggressive batters with high strike rates should be selected where possible. Run-scoring and batting determinants were found to be greatest in sub-continent conditions.

Saikia et al. [6] introduced that the Indian Premier League (IPL) was blamed for the poor performance of the Indian cricket team in the Twenty20 world cups in 2009 and 2010. This paper examines the performances of Indian and foreign cricketers in the IPL and corresponding world cups of those years to determine if the IPL can be held responsible for the cricketers' performance in the global event. A model is developed to measure the combined performance of a cricketer in batting, bowling, or wicketkeeping. The scores of a cricketer's performances in the IPL and corresponding world cup are compared to understand their performance level in the tournaments.

Bhattacharjee & Pahinkar [7] analyzed the performance of bowlers in the fourth season of the Indian Premier League, using combined bowling rate and multiple linear regression techniques. The study aimed to identify predictors influencing bowlers' performance in the twenty overs-a-side version of Cricket. The results indicated that the bowlers' experience and combined bowling rate in Twenty20 internationals were the most significant predictors of performance in IPL IV.

Dey et al. [8] analyze team performances in the first six sessions of the Indian Premier League (IPL), specifically in sports data mining. The study uses five multi-criteria techniques and two group decision analyses to handle imprecise and ambiguous data in a fuzzy environment. The research concludes that the proposed model provides a more realistic way to judge team performance and produces accurate performance appraisals. Twenty-20 Cricket is identified as the most popular and entertaining game among different formats of Cricket, and the IPL is credited with playing a vital role in increasing the status of Twenty-20 Cricket.

The goal of Lemmer's [9] work is to demonstrate, using a limited sample size, how batting and bowling performance metrics developed for one-day internationals may be used to Twenty20 matches. The best bowlers and batters from the first Twenty20 World Cup Series are ranked using these metrics.

Lemmer [10] introduces a new measure to assess the performance of cricket batsmen, which considers their average, strike rate, and consistency. The consistency coefficient is discussed and shown to be important in predicting a batsman's ability to score well. Using a data set of one-day international players, the three measures are combined into a single measure, and a classification scheme with ten classes is provided to compare batsmen. The study also provides a formula for batting performance and a classification table for Test players.

Lemmer [11] discusses the need for measures to assess current bowling performance in cricket matches. The current measures, DBR and CBR, are limited in their ability to reflect current performances, so modifications are proposed. A new measure, CBP, is developed to reflect current consistency and rank South African bowlers based on their one-day and test careers.

Lemmer [12] proposes a method to measure wicket- keeping performance in Cricket by combining dismissal rate and batting performance. The measures are developed and applied to rank wicketkeepers for test matches and one-day internationals. The rankings show that Adam Gilchrist, Brad Haddon, and Kamran Akmal are the top three wicketkeepers in tests, while Gilchrist, Haddon, and Dhoni are the top three in ODIs. The measures are easy to apply and provide a more comprehensive way of evaluating wicketkeepers than other methods found online.

Barr et al. [13] evaluate cricketers' batting and bowling performances in the 2007 cricket world cup using the methodology of Barr and Kantor. The authors extend the methodology to bowling and provide a performance ranking for risk tolerance levels. They also select a World cricket team based on this analysis. The paper provides insights into the dominance of the Australian team. It suggests that to match their performance, batsmen would have to accept a higher risk of dismissal for a faster scoring rate, and bowlers would have to accept a higher risk of conceding more runs for improved chances of taking wickets.

Lemmer [14] said that the Combined Bowling Rate (CBR) measures a bowler's performance, which considers the number of overs bowled, the number of runs conceded, and the number of wickets taken. However, it is suggested that the wickets of top-order batsmen should be given more weight than those of lower-order batsmen. This can be achieved by using weights for the wickets instead of just the number of wickets. The Dynamic Bowling Rate (DBR) is introduced as a modification of CBR that is more sensitive to a bowler's ability to take wickets. The weights are used to rate the bowlers in the 2003 npower Test series between South Africa and England.

Lemmer [15] argues that the traditional average is not a good measure of batting performance when a batsman has many not-out scores. The paper proposes a new estimator that provides a reliable estimate of the average, even in the case of a high percentage of not-out scores. The paper also suggests a comprehensive measure of batting performance for a short series. The paper argues why the traditional average should not be used in such cases.

Taliep et al. [16] investigated whether upper body strength was associated with cricket batting performance, as measured by hitting distance, batting average, and strike rate. The study found that upper body strength was positively correlated with hitting distance, but there were no significant correlations with batting average and strike rate for 1-Day and Twenty/20 matches. The results suggest that coaches could favour batsmen with stronger upper bodies for powerful strokes resulting in boundaries. Still, they cannot use upper body strength to predict overall batting performance.

Barr & Kantor [17] said that the traditional batting average statistic is insufficient to assess batting performance in limited-overs cricket, where a high strike rate is also crucial. A new graphical representation that combines strike rate and probability of getting out is proposed to provide a more comprehensive measure of batting performance. The authors apply this criterion to the batting performances of the 2003 World Cup and identify the consistent performances of Australian and Indian batsmen, providing a ranking of batting prowess for the top 20 run scorers in the tournament.

Shah [18] highlights the importance of measuring individual performance in Cricket for team selection. The traditional method of batting or bowling averages doesn't capture the quality of runs or wickets in different game situations. The study proposes a refined method that takes into account the quality of the bowler faced by a batsman or the quality of the batsman faced by a bowler. This method calculates a total performance index for each player by aggregating their performances against each opponent. This index can be used for player ranking.

Najdan et al. [19] examined the factors contributing to English domestic Twenty20 cricket success. The researchers analyzed 29 innings of winning teams and 30 innings of losing teams from the 2010 competition. They found that losing fewer wickets in the powerplay overs and between overs 7-10, 50+ run partnerships, and individual batsmen contributing 75+ or 50-74 runs were the top indicators of success. Winning teams also scored a higher percentage of total runs to long-off and off-side and bowled a higher percentage of deliveries at a yorker and short length. The findings suggest that teams should focus on retaining wickets in the first ten overs and outscoring the opposition in the final ten overs by hitting boundary 4s while avoiding scoring a high percentage of runs from 1s. A balanced strategy regarding bowling length appears to be advantageous.

Totterdell [20] investigated the relationship between mood changes and the performance of professional county cricketers during a championship match. The study involved thirty-three professional cricketers from four teams who rated their moods and performed thrice daily using pocket computers for up to four days. The study found that players' subjective and objective performances were related to their happiness, energy, enthusiasm, focus, and confidence during the match. Most players performed better when they felt less tense, but some performed better when they felt more tense. The findings were reinforced

by differences in players' recollections of their moods during best and worst performances. The study suggests that professional cricketers' performances are influenced by their moods.

Prakash et al. [21] discussed that T20 cricket and the Indian Premier League (IPL) tournament have revolutionized Cricket and attracted a huge fan following. Franchises bid for players, and ranking players according to their performance is essential for informed decision-making. The paper proposes a new index called the Deep Performance Index (DPI) that reflects the performance of batsmen and bowlers in T20 cricket. Machine learning and the Recursive Feature elimination algorithm extract meaningful features and their relative importance in designing the DPI. The paper shows that DPI outperforms other well-known ranking schemes for T20 cricket.

Stretch et al. [22] aimed to analyze the variations in impact positions on the cricket bat for cricketers of different skill levels and various strokes played off the front foot. The data was collected from three previous studies using a Cartesian grid on an instrumented bat. The results showed no significant variations in impact location for Provincial and Club cricketers but significant differences between impact points for batsmen and bowlers and between all strokes except for the off-drive. As the strokes were played wider, the impact point was further from the midline, increasing the risk of dismissal. The instrumented bat has implications for performance analysis of cricket technique and skill levels.

Tate et al. [23] aimed to investigate the influence of specific visual training programs on batting performance in cricket players. Thirty club-level male cricket batsmen were randomly divided into three equal groups: experimental, placebo, and control. The experimental group followed six weeks of visual training program, the placebo group was given simple reading material, and the control group followed routine cricket practice. The results showed a significant improvement in all visual variables and batting performance in the experimental group. The placebo and control groups also showed some improvement in batting performance but no significant improvement in visual variables. The study concluded that visual training programs improve the visual skills of cricketers, which could improve batting performance.

Bhattacharjee & Saikia [24] propose a composite index to measure the performance of cricketers. It uses binary integer programming to select a balanced squad of 15 players for a cricket tournament. The method is applied to select optimal squads from Indian players who participated in the Indian Premier League for different seasons, and the selected teams are compared to the actual Indian team selected for the International Cricket Council Twenty20 World Cups in 2009, 2010, and 2012. The study suggests that the optimization technique can be helpful for balanced team selection in other team sports.

Singh [25] measures the technical efficiency of cricket teams in the Indian Premier League using Data Envelopment Analysis (DEA) and total expenses as input and points, net run rate, profit, and revenues as output. Efficiency scores are correlated with league performance except for a few cases. The largest source of inefficiency is suboptimal production scale and inefficient transformation of inputs into outputs. The study has implications for sports management.

Barot et al. [26] discuss the popularity of Cricket, specifically the Indian Premier League (IPL), the most popular T20 domestic league globally. It explains how Cricket involves a lot of data and statistics that can be used to predict the outcome of a game. The article analyses the features of cricket matches in the IPL, including rating batsmen and bowlers based on their performance. In addition to conventional features, such as the toss and venue of games, team form and strength are considered in predicting match outcomes. The article proposes a novel analysis of batting and bowling based on batting and bowling indices. Machine learning algorithms have been used for match predictions, including SVM, Logistic Regression, Random Tree, Random Forest, and Naive Bayes. The results show that the Logistic Regression algorithm has the highest accuracy of 95%, followed by the Decision Tree with over 87% accuracy.

In their study of top youth football, Reeves and Roberts [27] looked at how players felt about performance analysis (PA). In particular, the purpose of this research was to look into people's views on PA and how they think it affects the performance of both individual and team players. An English Premier League Academy team's players, full-time coaches, and performance analysts were surveyed using semi-structured interviews to gather data. According to the results, while thinking about video-based performance analysis in top youth football, three things are important to keep in mind: (a) how it affects team and individual performance, (b) how it can be used for reflection, and (c) the psychological consequences.

Wright et al. [28] discuss how little attention has been paid to the context of delivering Performance Analysis (PA) feedback to elite football players. The investigation aimed to explore players' preferences for PA delivery, and comparisons were made between senior and academy players. The study found that the level of player engagement and interaction during video feedback sessions varied, and players preferred some delay before receiving video feedback. The study suggests that these findings could have implications for coach and analyst education and emphasizes the importance of considering the practical contexts of PA use within the player self-reflection process.

Nassis [29] aimed to investigate the impact of altitude on football performance during the 2010 World Cup in South Africa. The research hypothesized that endurance would be reduced above the altitude of 580 m and that technical skills would be affected due to the altered ball flight characteristics. The results indicate that playing football above 1200 m had a negative impact on endurance, with a 3.1% lower total distance covered compared to sea level. However, technical skills were not affected. The study recommends that teams acclimate before playing at an altitude as low as 1200 m to reduce the negative effects of altitude on physical performance.

Davis et al. [30] analyzed video footage of 18 elite female boxers during the 2012 London Olympic Games to understand the performance aspects of the sport. Winners showed a higher activity rate, movement rate, and punch accuracy in certain rounds, with specific techniques such as straight rear-hand and body punches, uppercut punches, and defensive foot movements discriminating between successful and unsuccessful boxers. The findings provide insights into the demands of elite amateur female boxing that can be used for designing training programs and guiding sport-specific fitness testing.

Hansen et al. [31] analyzed the save performance of goalkeepers in the 2015 men's handball World Championships. The goalkeepers from 24 national teams were studied using a tracking camera system and bespoke software. The study found a significant relationship between the goalkeepers' save statistics and the final team rankings. The saving rate is important for teams to achieve a higher ranking, and the throwing distribution and success/save rate during the tournament suggest areas of strength and weakness in the goal area, which coaches can use to adjust their training approaches for both goalkeepers and shooters.

Latella et al. [32] analyzed competition data from 1368 powerlifters in 2017 to understand the factors affecting strength in powerlifting athletes. Relative strength was compared for the squat, bench press, and deadlift between age groups, weight classes, and sexes. The study found that relative strength was greater for males across all lifts and tended to decrease with increasing body mass and age for both males and females. The findings provide important information for coaches developing resistance training programs for powerlifters and other strength-based sports.

Engelmann [33] discusses the importance of understanding a player's impact on the outcome of an NBA game for general managers, gamblers, and fans. Traditionally, teams relied on scouts for this information, but in the last 20 years, advanced player metrics have become more common in decision-making processes. Advanced player metrics have advantages over scouts, including quickly synthesizing information from all games in a season and providing a more objective assessment of player impact. This information is essential for managers who want to sign impactful players to cost-effective contracts and avoid overpaying for perceived superstars who do not significantly help the team win.

Stetter et al. [34] aimed to investigate the feasibility of using wearable accelerometers to measure performance-related biomechanical changes in ice hockey players of different skill levels during forward skating sprints. The researchers found that high-calibre players had increased stride propulsion and shorter contact time. The temporal stride characteristics and propulsive power differed across skill levels and skating phases. Accelerometers have the potential to assess skating technique and performance, and these findings may contribute to establishing wearable sensors for in-field ice hockey skating performance analysis.

5. Methodology

Rajasthan Royals is my favourite team. Because they are introducing young stars into this tournament, RR gives young players more opportunities. We loved the way they treated young stars. They are the runners of the IPL T-20 year 2022. so we selected Rajasthan Royal for the study. This paper explains the selection of teams, design of the study, selection of variables, reasons for selecting the variables, data reliability, data collection, and the statistical techniques employed to analyze the data.

5.1. Selection of Team

The Indian Premier League is a domestic t20 league conducted by India's Board of Control of Cricket. The number of teams in the league is 10. To achieve the purpose of the study, the Rajasthan Royals team from IPL was selected. Their performance for the year 2022 was taken.

5.2. Selection of Variables

The research scholar reviewed the websites, magazines, and research papers about the study besides the expert’s opinion. Taking into consideration the feasibility criteria in terms of the availability of the data and the relevance of the variables to the present study, the following variables were selected:

- Runs scored by the batsmen.
- Boundaries scored by the batsmen.
- Sixes scored by the batsmen.

5.3. Collection of Data

The data was collected for one year (2022) of Rajasthan Royals as they ended up as the season's runners-up, with Sanju Samson leading them.

5.4. Reasons for Selecting the Variables

Runs Scored: In Cricket, a run is the unit of scoring. The team with the most runs wins in many versions of the game. It always draws at worst, except for some results decided by the DLS method, which is used in rain-shortened limited-overs games when the two teams have had different opportunities to score runs. The number of runs scored by the batsmen is always important for the teams as it decides the game's result.

Boundaries: "Four" refers to a scoring shot where the batsman hits the ball and reaches the boundary rope without touching the ground. It earns the batting team four runs. The ball can be hit along the ground or in the air if it crosses the boundary without bouncing or being touched by a fielder. A four is a common and valuable scoring shot in Cricket, as it helps the batting team accumulate runs quickly.

Sixes: A "six" refers to a scoring shot where the ball is hit over the boundary without bouncing on the ground. It is the maximum number of runs that can be scored off a single delivery. When a batsman hits a six, six runs are added to the team's total. It is achieved by striking the ball with significant power and timing, usually using a lofted shot. Sixes are an exciting part of the game and are often celebrated by fans and players alike.

6. Analysis of The Data and Results of The Study

The purpose of the present study was to analyze the performance of Rajasthan Royals' batters in the 2022 IPL T-20 franchise. To achieve the purpose of the present study, the collected data on the runs contributed by the Rajasthan Royals' batters in the 2022 Indian Premier League leading towards winning were Test Premier League percentage method. The obtained results were well-tabulated and presented in this paper (Table 1).

Table 1: The Performance of Different order of Players in 17 matches in percentage

MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
1	**151**	**45**	**0**	**196**
PERCENTAGE	77.04	22.95	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
2	**138**	**41**	**3**	**182**
PERCENTAGE	75.82	22.52	1.64	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
3	**119**	**42**	**0**	**161**
PERCENTAGE	73.91	26.08	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
4	**59**	**95**	**2**	**156**
PERCENTAGE	37.82	60.89	1.28	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
5	**73**	**53**	**26**	**152**
PERCENTAGE	48.02	34.86	17.1	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
6	**191**	**10**	**0**	**201**

PERCENTAGE	95.02	4.97	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
7	**217**	**0**	**0**	**217**
PERCENTAGE	100	0	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
8	**59**	**75**	**7**	**141**
PERCENTAGE	41.84	53.19	4.96	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
9	**115**	**30**	**1**	**146**
PERCENTAGE	78.76	20.54	0.68	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
10	**91**	**52**	**0**	**143**
PERCENTAGE	63.63	36.36	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
11	**152**	**31**	**0**	**183**
PERCENTAGE	83.06	16.93	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
12	**124**	**27**	**3**	**154**
PERCENTAGE	80.51	17.53	1.94	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
13	**114**	**43**	**17**	**174**
PERCENTAGE	65.51	24.71	9.77	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
14	**79**	**56**	**0**	**135**
PERCENTAGE	58.51	41.48	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
15	**167**	**10**	**0**	**177**
PERCENTAGE	94.35	5.64	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
16	**159**	**2**	**0**	**161**
PERCENTAGE	98.75	1.24	0	
MATCHES	TOP ORDER	MIDDLE ORDER	TAIL END	TOTAL
17	**77**	**32**	**19**	**128**
PERCENTAGE	60.15	25	14.84	
	2085	644	78	2807

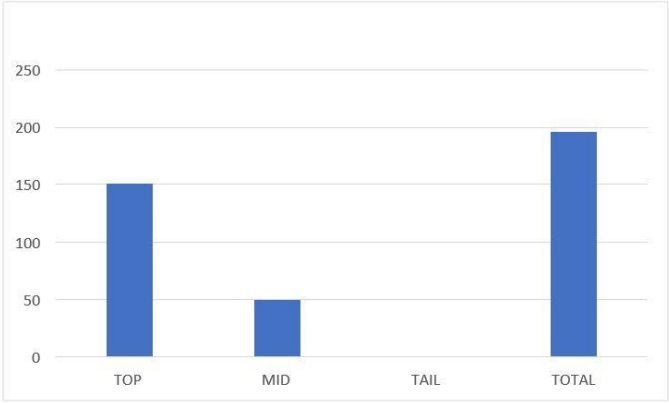

Figure 1: Contribution of each order by finding the percentage of the total in Match 1

Top order: The top order has a 151 out of the total score of 196. The contribution of the top order is calculated by dividing the top score by the total score and multiplying by 100 to get a percentage. Contribution of top order = (151 / 196) * 100 ≈ 77.04%. The top order contributed approximately 77.04% to the total score (Figure 1).

Middle order: The middle order scores 45 out of the total score of 196. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (45 / 196) * 100 ≈ 22.95%. The middle order contributed approximately 22.95% to the total score.

Tail end: The tail end has a 0 out of the total score of 196. As it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 77.04% to the total score.
- The middle order contributed approximately 22.95% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed more to the winning, with a contribution of 77.04%.

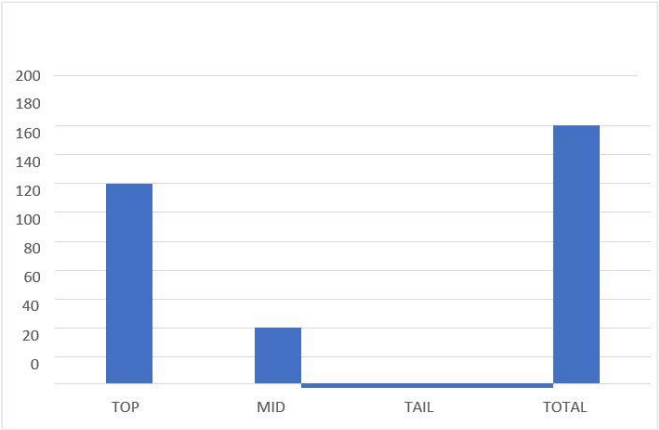

Figure 2: Contribution of each order by finding the percentage of the total in Match 2

Top Order: The top order has a score of 138 out of the total score of 182. To calculate the contribution, divide the top score by the total score and multiply by 100 to get a percentage. Contribution of top order = (138 / 182) * 100 ≈ 75.82%. The top order contributed approximately 75.82% to the total score (Figure 2).

Middle order: The middle order has a score of 41 out of the total score of 182. Similar to the top order, we calculate the contribution as a percentage. Contribution of middle order = (41 / 182) * 100 ≈ 22.52%. The middle order contributed approximately 22.52% to the total score.

Tail End: The tail end has a score of 3 out of the total score of 182. We calculate the contribution as a percentage. Contribution of tail end = (3 / 182) * 100 ≈ 1.64%. The tail end contributed approximately 1.64% to the total score.

Summary:

- The top order contributed approximately 75.82% to the total score.
- The middle order contributed approximately 22.52% to the total score.
- The tail end contributed approximately 1.64% to the total score.

Therefore, the top order contributed the most to the winning, with a contribution of 75.82%.

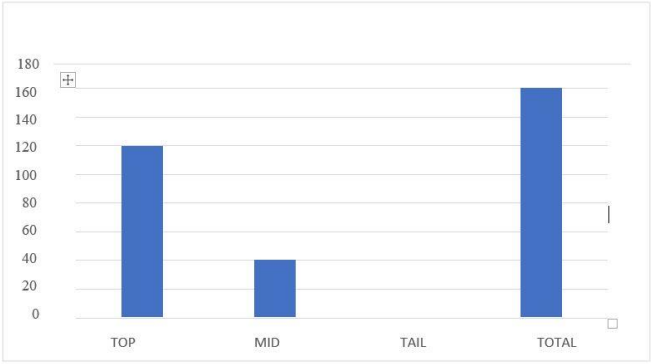

Figure 3: Contribution of each order by finding the percentage of the total in Match 3

Top Order: The top order has a 119 out of the total score of 161. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Top order contribution = (119 / 161) * 100 ≈ 73.91%. The top order contributed approximately 73.91% to the total score (Figure 3).

Middle order: The middle order has a 42 out of the total score of 161. We calculate the contribution of the middle order as a percentage. Middle order contribution = (42 / 161) * 100 ≈ 26.08%. The middle order contributed approximately 26.08% to the total score.

Tail end: The tail end has a 0 out of the total score 161. Since it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 73.91% to the total score.
- The middle order contributed approximately 26.08% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed more to the winning, with a contribution of 73.91%.

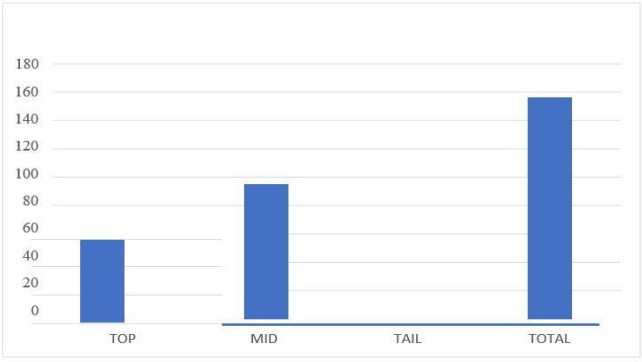

Figure 4: Contribution of each order by finding the percentage of the total in Match 4

Top Order: The top order scored 59 out of the total score of 156. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (59 / 156) * 100 ≈ 37.82%. The top order contributed approximately 37.82% to the total score (Figure 4).

Middle order: The middle order has a 95 out of the total score of 156. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (95 / 156) * 100 ≈ 60.89%. The middle order contributed approximately 60.89% to the total score.

Tail end: The tail end has a score of 2 out of the total score of 156. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (2 / 156) * 100 ≈ 1.28%. The tail end contributed approximately 1.28% to the total score.

Summary:

- The top order contributed approximately 37.82% to the total score.
- The middle order contributed approximately 60.89% to the total score.
- The tail end contributed approximately 1.28% to the total score.

Based on the contributions, the middle order contributed more to the winning, with a contribution of 60.89%.

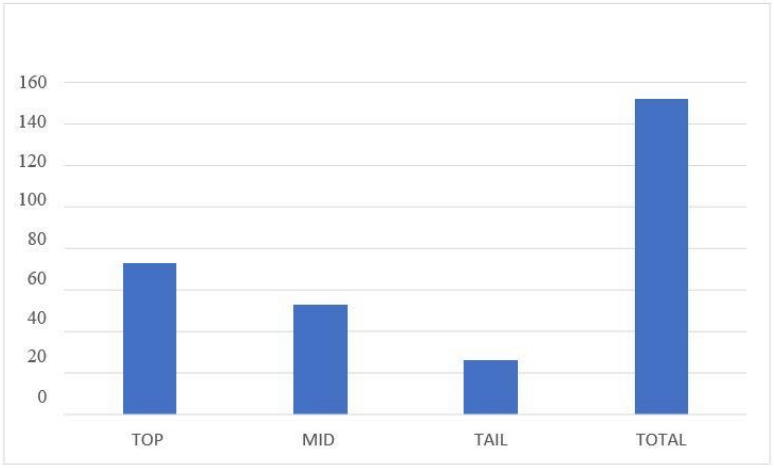

Figure 5: Contribution of each order by finding the percentage of the total in Match 5

Top Order: The top order has a 73 out of the total score of 152. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (73 / 152) * 100 ≈ 48.02%. The top order contributed approximately 48.02% to the total score (Figure 5).

Middle order: The middle order has a score of 53 out of the total score of 152. We calculate the contribution of the middle order as a percentage. Middle order contribution = (53 / 152) * 100 ≈ 34.86%. The middle order contributed approximately 34.86% to the total score.

Tail end: The tail end has a 26 out of the total score 152. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (26 / 152) * 100 ≈ 17.1%. The tail end contributed approximately 17.1% to the total score.

Summary:

- The top order contributed approximately 48.02% to the total score.
- The middle order contributed approximately 34.86% to the total score.
- The tail end contributed approximately 17.1% to the total score.

Based on the contributions, the top order contributed the most to the winning, with a contribution of 48.02%.

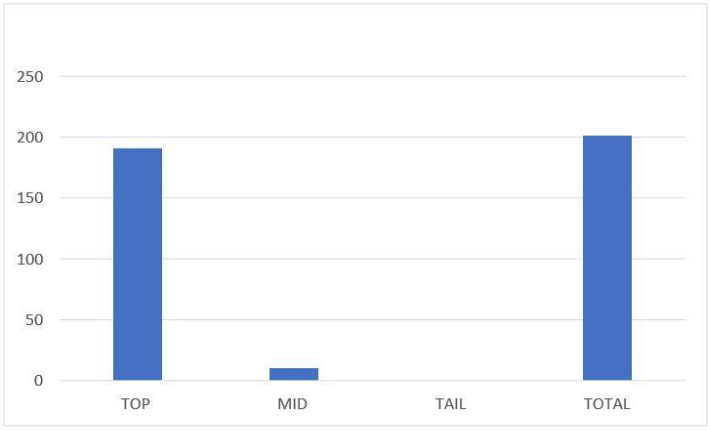

Figure 6: Contribution of each order by finding the percentage of the total in Match 6

Top Order: The top order has 191 out of the total score of 201. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (191 / 201) * 100 ≈ 95.02%. The top order contributed approximately 95.02% to the total score (Figure 6).

Middle order: The middle order has a 10 out of the total score of 201. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (10 / 201) * 100 ≈ 4.97%. The middle order contributed approximately 4.97% to the total score.

Tail end: The tail end has a 0 out of the total score of 201. As it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 95.02% to the total score.
- The middle order contributed approximately 4.97% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed significantly more to the winning, with a contribution of 95.02%.

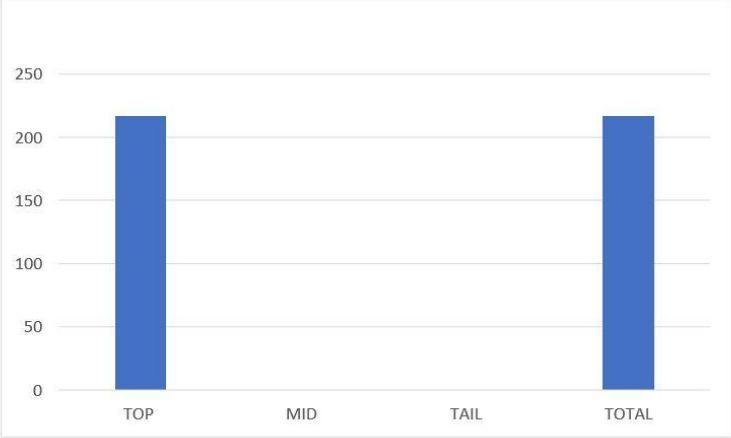

Figure 7: Contribution of each order by finding the percentage of the total in Match 7

Top Order: The top order has a score of 217 out of the total score of 217. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Top order contribution = (217 / 217) * 100 = 100%. The top order contributed 100% to the total score (Figure 7).

Middle order: The middle order has a 0 out of the total score 217. As it did not contribute any points, its contribution percentage is 0%.

Tail end: The tail end also scores 0 out of 217. Like the middle order, it did not contribute any points, resulting in a 0% contribution.

Summary:

- The top order contributed 100% to the total score.
- The middle order did not contribute any points, resulting in a 0% contribution.
- The tail end also did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed significantly more to the winning with a contribution of 100%.

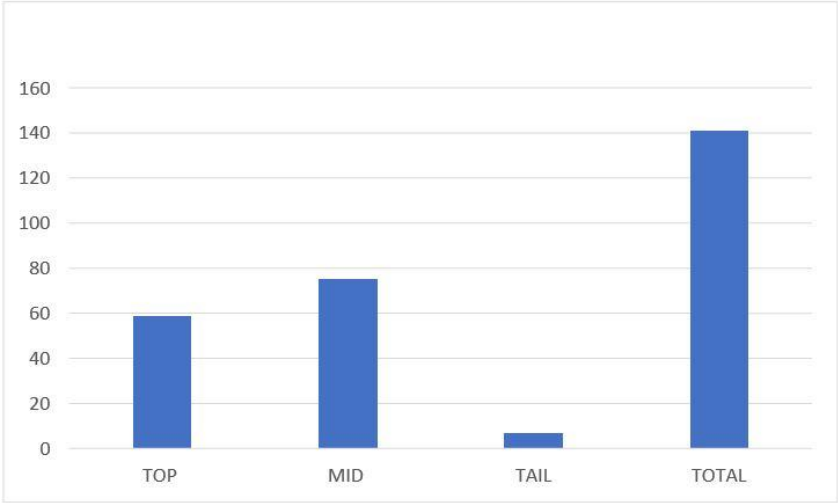

Figure 8: Contribution of each order by finding the percentage of the total in Match 8

Top Order: The top order has a 59 out of the total score 141. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (59 / 141) * 100 ≈ 41.84%. The top order contributed approximately 41.84% to the total score (Figure 8).

Middle order: The middle order is 75 out of the total score of 141. We calculate the contribution of the middle order as a percentage. Middle order contribution = (75 / 141) * 100 ≈ 53.19%. The middle order contributed approximately 53.19% to the total score.

Tail end: The tail end has a score of 7 out of the total score of 141. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (7 / 141) * 100 ≈ 4.96%. The tail end contributed approximately 4.96% to the total score.

Summary:

- The top order contributed approximately 41.84% to the total score.
- The middle order contributed approximately 53.19% to the total score.
- The tail end contributed approximately 4.96% to the total score.

Based on the contributions, the middle order contributed the most to the winning, with a contribution of 53.19%.

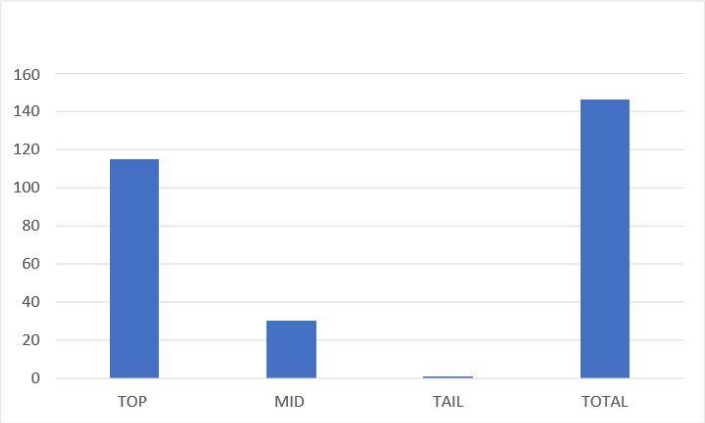

Figure 9: Contribution of each order by finding the percentage of the total in Match 9

Top Order: The top order scores 115 out of the total score of 146. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (115 / 146) * 100 ≈ 78.76%. The top order contributed approximately 78.76% to the total score (Figure 9).

Middle order: The middle order has a score of 30 out of the total score of 146. We calculate the contribution of the middle order as a percentage. Middle order contribution = (30 / 146) * 100 ≈ 20.54%. The middle order contributed approximately 20.54% to the total score.

Tail end: The tail end has a score of 1 out of the total score of 146. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (1 / 146) * 100 ≈ 0.68%. The tail end contributed approximately 0.68% to the total score.

Summary:

- The top order contributed approximately 78.76% to the total score.
- The middle order contributed approximately 20.54% to the total score.
- The tail end contributed approximately 0.68% to the total score.

Based on the contributions, the top order contributed significantly more to the winning, with a contribution of 78.76%.

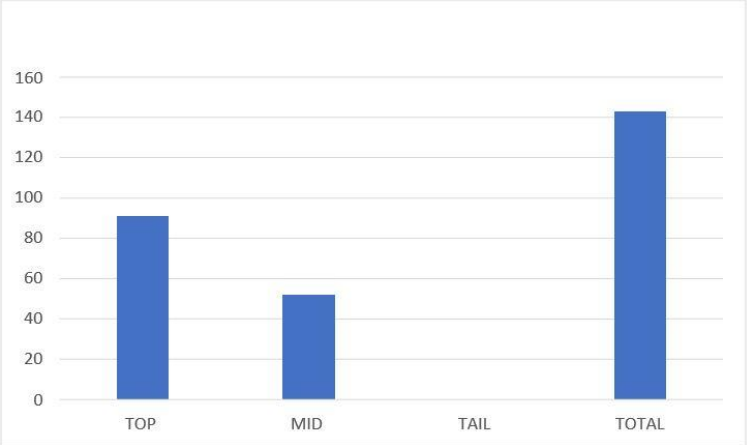

Figure 10: Contribution of each order by finding the percentage of the total in Match10

Top Order: The top order has a 91 out of the total score 143. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (91 / 143) * 100 ≈ 63.63%. The top order contributed approximately 63.63% to the total score (Figure 10).

Middle order: The middle order has a 52 out of the total score 143. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (52 / 143) * 100 ≈ 36.36%. The middle order contributed approximately 36.36% to the total score.

Tail end: The tail end has a score of 0 out of the total score of 143. As it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 63.63% to the total score.
- The middle order contributed approximately 36.36% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed more to the winning, with a contribution of 63.63%.

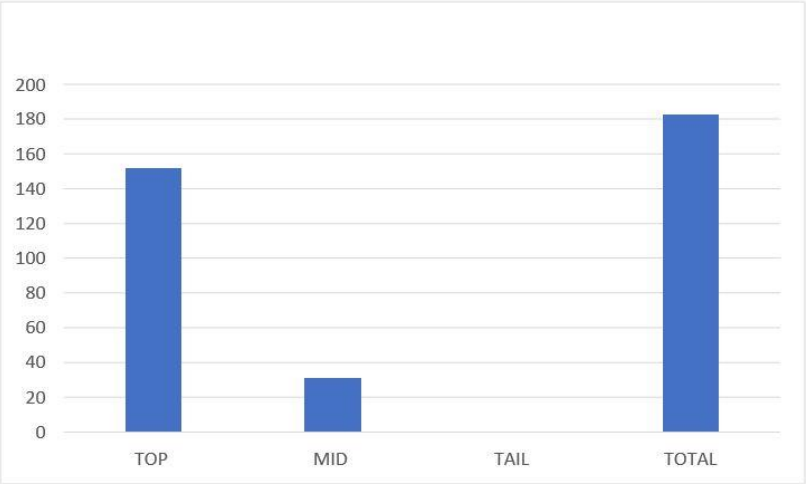

Figure 11: Contribution of each order by finding the percentage of the total in Match11

Top Order: The top order has a score of 152 out of the total score of 183. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (152 / 183) * 100 ≈ 83.06%. The top order contributed approximately 83.06% to the total score (Figure 11).

Middle order: The middle order has a score of 31 out of the total score of 183. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (31 / 183) * 100 ≈ 16.93%. The middle order contributed approximately 16.93% to the total score.

Tail end: The tail end has a 0 out of the total score 183. As it did not contribute any points, its contribution percentage is 0%.

Summary:

The top order contributed approximately 83.06% to the total score.
The middle order contributed approximately 16.93% to the total score.
The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed significantly more to the winning, with a contribution of 83.06%.

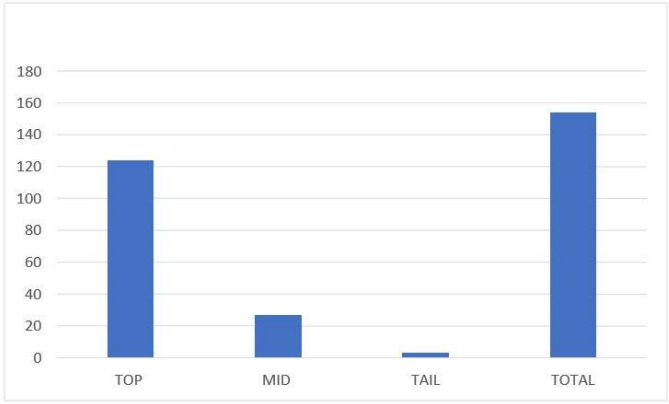

Figure 12: Contribution of each order by finding the percentage of the total in Match12

Top Order: The top order scores 124 out of the total 154. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (124 / 154) * 100 ≈ 80.51%. The top order contributed approximately 80.51% to the total score (Figure 12).

Middle order: The middle order is 27 out of the total score of 154. We calculate the contribution of the middle order as a percentage. Middle order contribution = (27 / 154) * 100 ≈ 17.53%. The middle order contributed approximately 17.53% to the total score.

Tail end: The tail end has a score of 3 out of the total score of 154. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (3 / 154) * 100 ≈ 1.94%. The tail end contributed approximately 1.94% to the total score.

Summary:

- The top order contributed approximately 80.51% to the total score.
- The middle order contributed approximately 17.53% to the total score.
- The tail end contributed approximately 1.94% to the total score.

Based on the contributions, the top order contributed significantly more to the winning, with a contribution of 80.51%.

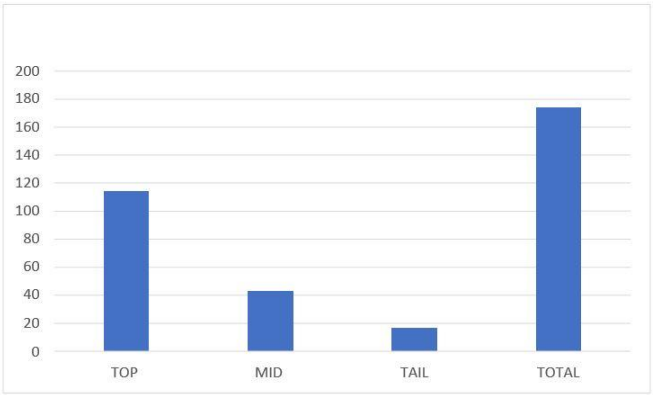

Figure 13: Contribution of each order by finding the percentage of the total in Match 13

Top Order: The top order has a score of 114 out of the total score of 174. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (114 / 174) * 100 ≈ 65.51%. The top order contributed approximately 65.51% to the total score (Figure 13).

Middle order: The middle order scored 43 out of 174. We calculate the contribution of the middle order as a percentage. Middle order contribution = (43 / 174) * 100 ≈ 24.71%. The middle order contributed approximately 24.71% to the total score.

Tail end: The tail end has a 17 out of the total score 174. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (17 / 174) * 100 ≈ 9.77%. The tail end contributed approximately 9.77% to the total score.

Summary:

- The top order contributed approximately 65.51% to the total score.
- The middle order contributed approximately 24.71% to the total score.
- The tail end contributed approximately 9.77% to the total score.

Based on the contributions, the top order contributed the most to the winning, with a contribution of 65.51%.

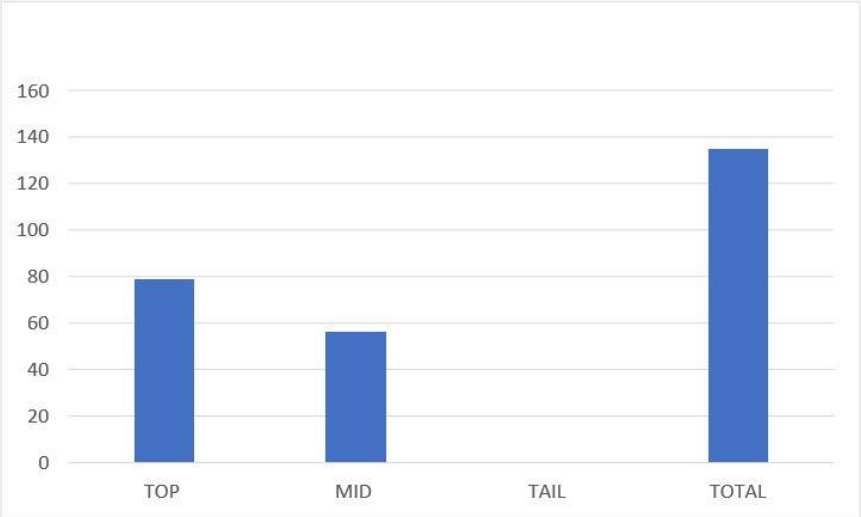

Figure 14: Contribution of each order by finding the percentage of the total in Match 14

Top Order: The top order has a 79 out of the total score of 135. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (79 / 135) * 100 ≈ 58.51%. The top order contributed approximately 58.51% to the total score (Figure 14).

Middle order: The middle order has 56 out of the total score of 135. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (56 / 135) * 100 ≈ 41.48%. The middle order contributed approximately 41.48% to the total score.

Tail end: The tail end has a 0 out of the total score of 135. As it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 58.51% to the total score.
- The middle order contributed approximately 41.48% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed more to the winning, with a contribution of 58.51%.

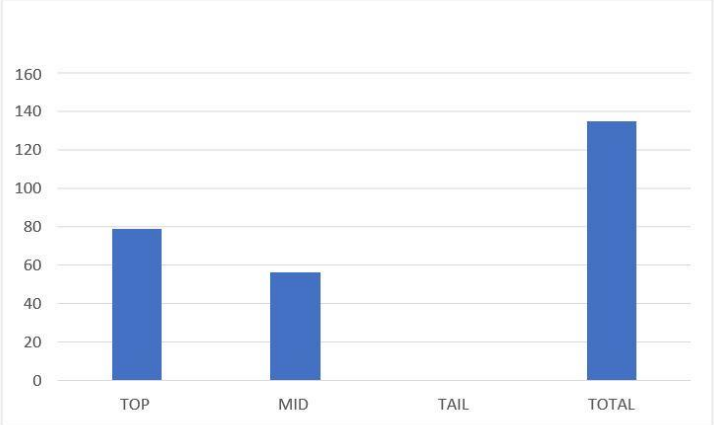

Figure 15: Contribution of each order by finding the percentage of the total in Match15

Top Order: The top order has a 167 out of the total score of 177. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (167 / 177) * 100 ≈ 94.35%. The top order contributed approximately 94.35% to the total score (Figure 15).

Middle order: The middle order has a score of 10 out of the total score of 177. We calculate the contribution of the middle order as a percentage. Contribution of middle order = (10 / 177) * 100 ≈ 5.64%. The middle order contributed approximately 5.64% to the total score.

Tail end: The tail end has a score of 0 out of the total score of 177. As it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 94.35% to the total score.
- The middle order contributed approximately 5.64% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed significantly more to the winning, with a contribution of 94.35%.

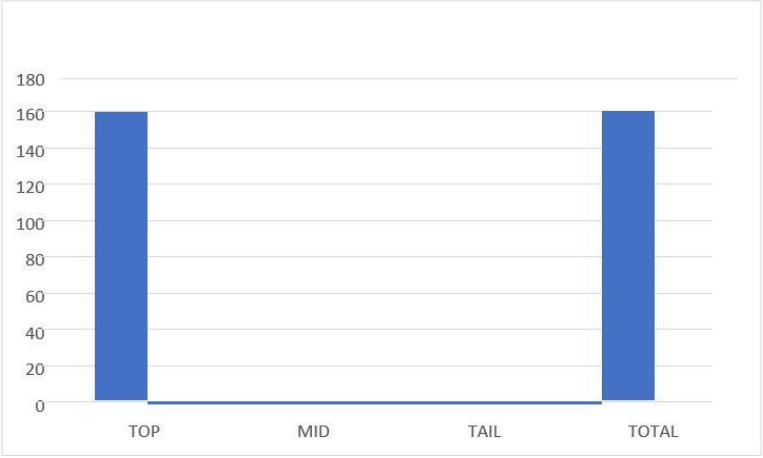

Figure 16: Contribution of each order by finding the percentage of the total in Match 16

Top Order: The top order has a 159 out of the total score of 161. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Top order contribution = (159 / 161) * 100 ≈ 98.75%. The top order contributed approximately 98.75% to the total score (Figure 16).

Middle order: The middle order has a score of 2 out of the total score of 161. We calculate the contribution of the middle order as a percentage. Middle order contribution = (2 / 161) * 100 ≈ 1.24%. The middle order contributed approximately 1.24% to the total score.

Tail end: The tail end has a 0 out of the total score 161. As it did not contribute any points, its contribution percentage is 0%.

Summary:

- The top order contributed approximately 98.75% to the total score.
- The middle order contributed approximately 1.24% to the total score.
- The tail end did not contribute any points, resulting in a 0% contribution.

Based on the contributions, the top order contributed significantly more to the winning, with a contribution of 98.75%.

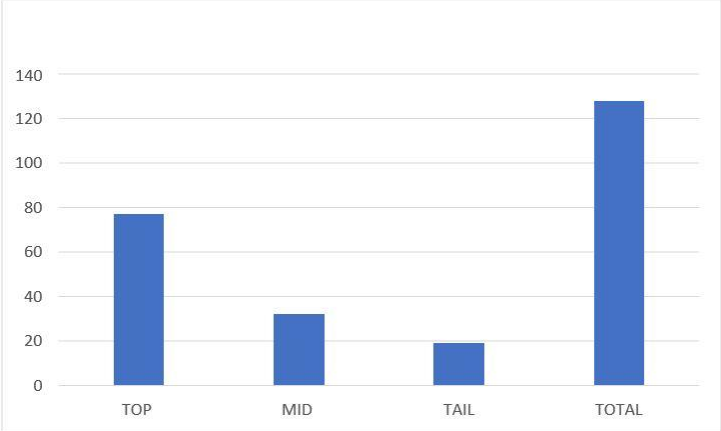

Figure 17: Contribution of each order by finding the percentage of the total in Match 17

Top Order: The top order has a score of 77 out of the total score of 128. To calculate the contribution, we divide the top score by the total score and multiply it by 100 to obtain a percentage. Contribution of top order = (77 / 128) * 100 ≈ 60.15%. The top order contributed approximately 60.15% to the total score (Figure 17).

Middle order: The middle order has a score of 32 out of the total score of 128. We calculate the contribution of the middle order as a percentage. Middle order contribution = (32 / 128) * 100 ≈ 25%. The middle order contributed approximately 25% to the total score.

Tail end: The tail end has a 19 out of the total score 128. We calculate the contribution of the tail end as a percentage. Contribution of tail end = (19 / 128) * 100 ≈ 14.84%. The tail end contributed approximately 14.84% to the total score.

Summary:

- The top order contributed approximately 60.15% to the total score.
- The middle order contributed approximately 25% to the total score.
- The tail end contributed approximately 14.84% to the total score.

Based on the contributions, the top order contributed the most to the winning, with a contribution of 60.15%.

Table 2: The number of Boundaries (fours) secured by different orders of Bars men

MATCHES	TOP	MID	TAIL	TOTAL
1	12	4	0	16
2	13	4	0	17
3	2	4	0	6
4	8	1	0	9

5	8	3	1	12
6	17	1	0	18
7	21	0	0	21
8	6	3	0	9
9	9	3	0	12
10	11	2	0	13
11	21	3	0	24
12	12	2	0	14
13	17	3	0	20
14	10	4	0	14
15	19	0	0	19
16	12	0	0	12
17	8	3	0	11
	206	40	1	247
	83.40%	**16.19%**	**0.40%**	**100%**

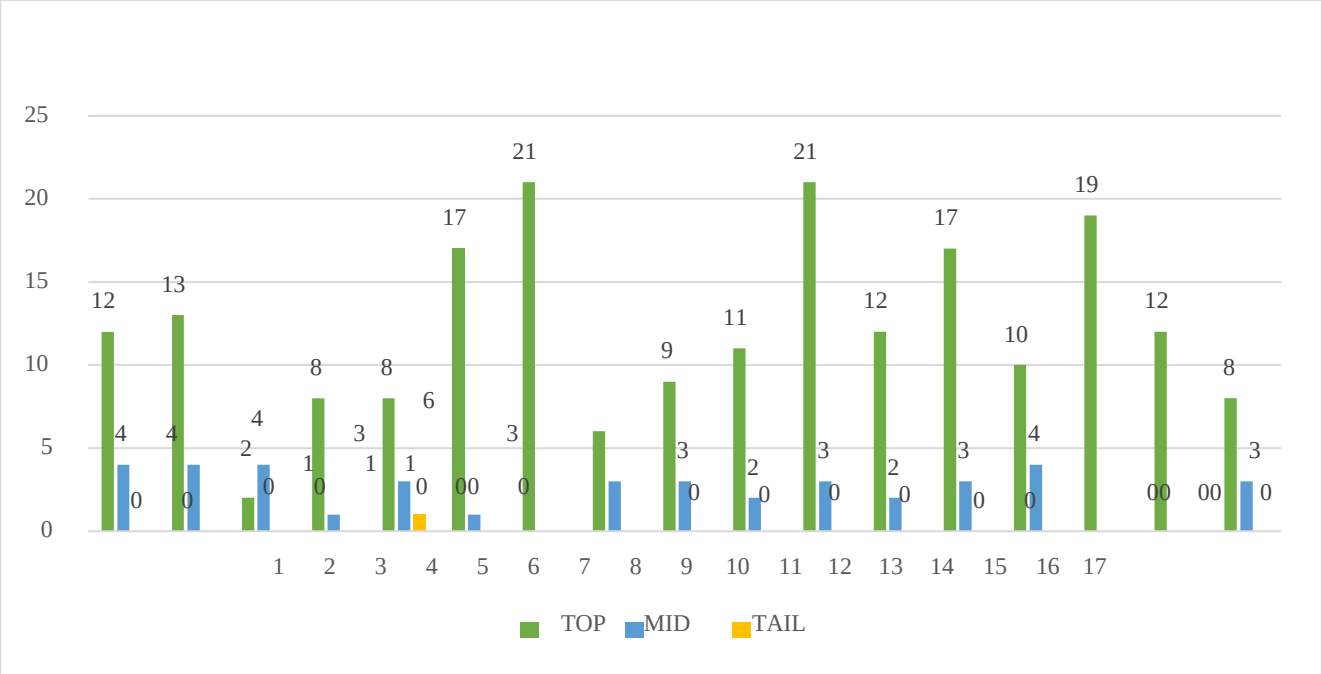

Figure 18: The number of Boundaries (fours) secured by different orders of Bars men

In the first match, the top order contributed 75% to the total score, and the middle order contributed 25%. Since there is no tail end, we can conclude that the top order contributed more to the winning (Table 2). In the second match, the top and mid categories contributed almost equally to the total score, 76.47% and 23.53%, respectively. Again, there is no tail end, so the top order contributed more to the winning. In the third match, the middle order contributed 66.67% to the total score, while the top order contributed 33.33%. The top order contributed less in this case. In the fourth match, the top order contributed 88.89% to the total score, and the middle order contributed 11.11%. The top order contributed more to the winning. In the fifth match, the top order contributed 66.67%, the middle order contributed 25%, and the tail end contributed 8.33% to the total score. The top order contributed the most to the winning. In the sixth match, the top order contributed 94.44% to the total score, while the middle order contributed 5.56%. The top order significantly contributed more to the winning. In the seventh match, the top order contributed 100% to the total score since no other order existed. Thus, the top order contributed more to the winning (Figure 18).

In the eighth match, the top order contributed 66.67%, and the middle order contributed 33.33%. The top order contributed more. In the ninth match, the top order contributed 75%, and the middle order contributed 25%. The top order contributed more. In the tenth match, the top order contributed 84.62%, and the middle order contributed 15.38%. The top order contributed more. In the eleventh match, the top order contributed 87.5%, and the middle order contributed 12.5%. The top order contributed more. In the twelfth match, the top order contributed 85.71%, and the middle order contributed 14.29%. The top order

contributed more. In the thirteenth match, the top order contributed 85%, and the middle order contributed 15%. The top order contributed more. In the fourteenth match, the top order contributed 71.43%, and the middle order contributed 28.57%. The top order contributed more. In the fifteenth match, the top order contributed 100% to the total score since no other order existed. The top order contributed more. The top order contributed 100% to the score in the sixteenth match. The top order contributed more. In the seventeenth match, the top order contributed 72.73%, and the middle order contributed 27.27%. The top order contributed more. Based on the given data, the top order contributed more to the winning in most cases (Table 3).

Table 3: The number of SIXES scored by different order of batsmen in 17 matches

MATCHES	TOP	MID	TAIL	TOTAL
1	11	3	0	14
2	8	3	0	11
3	9	2	0	11
4	1	9	0	10
5	5	2	0	7
6	10	0	0	10
7	14	0	0	14
8	4	4	0	8
9	6	1	0	7
10	1	4	0	5
11	3	2	0	5
12	5	1	0	6
13	3	1	0	4
14	1	3	0	4
15	7	0	0	7
16	10	0	0	10
17	2	0	2	4
	100	35	2	137
	72.99%	**25.55%**	**1.45%**	**100%**

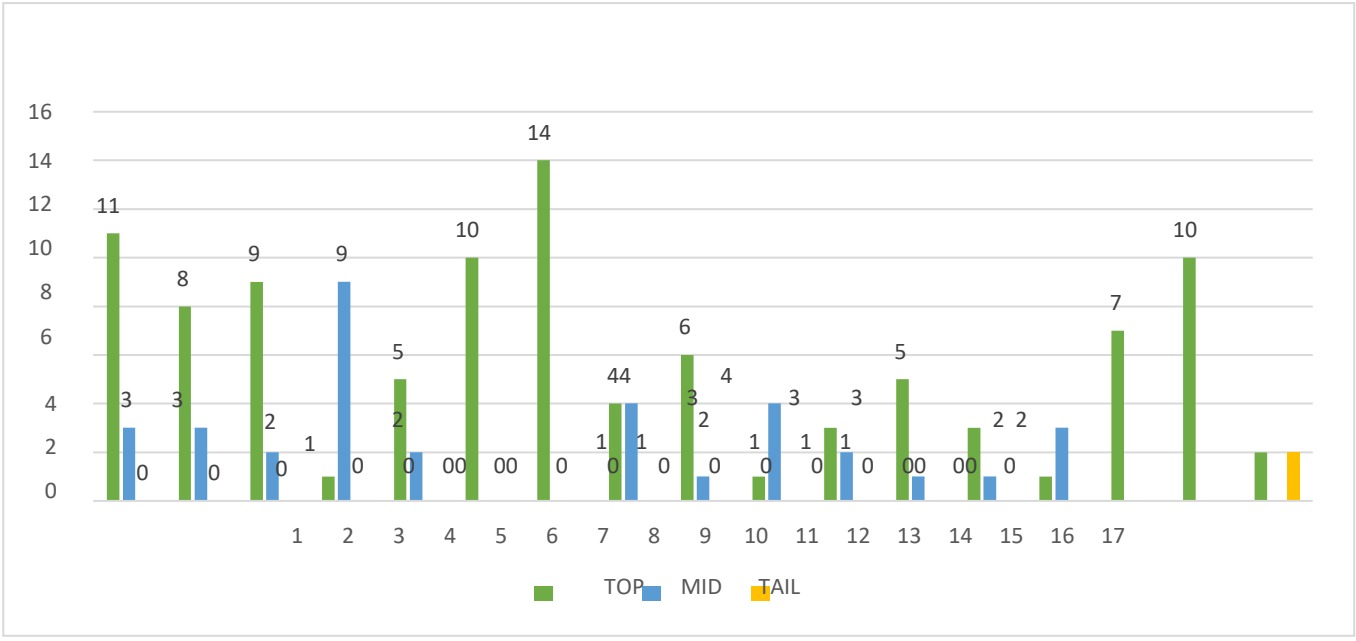

Figure 19: The number of Sixes secured by different orders of Bars men

In the first match, the top order contributed 78.57% to the total score, and the middle order contributed 21.43%. Since there is no tail end, we can conclude that the top order contributed more to the winning. In the second match, the top order contributed

72.73% to the total score, and the middle order contributed 27.27%. Again, there is no tail end, so the top order contributed more to the winning. In the third match, the top order contributed 81.82% to the total score, and the middle order contributed 18.18%. The top order contributed more. In the fourth match, the top order contributed 10% to the total score, and the middle order contributed 90%. In this case, the middle order contributed more to the winning. In the fifth match, the top order contributed 71.43% to the total score, and the middle order contributed 28.57%. The top order contributed more. In the sixth match, the top order contributed 100% to the total score since no other order exists. The top order contributed more to the winning. The top order contributed 100% to the score in the seventh match and the top order contributed more (Figure 19).

In the eighth match, the top and mid categories contributed equally, with 50% each. Since there is no tail end, both categories contributed equally to the winning. In the ninth match, the top order contributed 85.71% to the total score, and the middle order contributed 14.29%. The top order contributed more. In the tenth match, the top order contributed 20% to the total score, and the middle order contributed 80%. The middle order contributed more to the winning. In the eleventh match, the top order contributed 60% to the total score, and the middle order contributed 40%. The top order contributed more. In the twelfth match, the top order contributed 83.33% to the total score, and the middle order contributed 16.67%. The top order contributed more. In the thirteenth match, the top order contributed 75% to the total score, and the middle order contributed 25%. The top order contributed more. In the fourteenth match, the top order contributed 100% to the total score since no other order existed. The top order contributed more. The top order contributed 100% to the score in the fifteenth match. The top order contributed more. In the sixteenth match, the top order contributed 50% to the total score, and the tail end contributed 50%. Since there is no middle order, the top and tail categories contributed equally to the winning. Based on the data, the top order contributed more to the winning in most cases.

7. Discussion and Findings

In this study, the hypothesis proposes that the contribution of batters plays a significant role in determining the outcome of a match. The hypothesis suggests that the performance of batters influences the team's chances of winning. To investigate this hypothesis, several factors need to be considered. First, it is important to determine how the contribution of batters can be measured. This may involve analyzing various batting statistics such as batting average, strike rate, number of boundaries, or the ability to score runs consistently. Additionally, the study should consider other variables that could potentially influence match outcomes. Factors such as bowlers' performance, fielding skills, team strategy, and external conditions (e.g., weather or pitch) can all impact the final result. A comprehensive approach can be adopted to gather data for analysis. This may involve collecting and analyzing match statistics from a sample of games across different teams, formats (such as Test, ODI, or T20), and levels of competition. Historical data and match archives can be utilized to ensure a wide range of scenarios are considered.

Statistical techniques, such as regression analysis or correlation analysis, can be applied to examine the relationship between the performance of batters and the match outcome. By controlling for other variables, the study can isolate the specific contribution of batters to winning matches. It is important to acknowledge the limitations of the study. Team dynamics, individual player form, and match-specific circumstances may influence the results. Additionally, the study should consider potential biases, such as sample selection or data quality issues, and address them appropriately. Overall, investigating the hypothesis that the contribution of batters leads to a pathway to win the match requires a rigorous research approach, careful data analysis, and consideration of various factors that may affect match outcomes. The findings of this study can provide valuable insights into the significance of batters' performance in determining match results.

In Match 1, the top order contributed approximately 77.04% to the total score, while the middle order contributed 22.95%, and the tail end contributed 0%. In Match 2, the top order contributed approximately 75.82% to the total score, the middle order contributed approximately 22.52%, and the tail end contributed approximately 1.64%. In Match 3, the top order contributed approximately 73.91% to the total score, the middle order contributed approximately 26.08%, and the tail end contributed 0%. In Match 4, the top order contributed approximately 37.82% to the total score, the middle order contributed approximately 60.89%, and the tail end contributed approximately 1.28%. In Match 5, the top order contributed approximately 48.02% to the total score, the middle order contributed approximately 34.86%, and the tail end contributed approximately 17.1%. In Match 6, the top order contributed approximately 95.02% to the total score, the middle order contributed approximately 4.97%, and the tail end contributed 0%. In Match 7, the top order contributed 100% to the total score, while the mid and tail categories did not contribute any points. In Match 8, the top order contributed approximately 41.84% to the total score, the middle order contributed approximately 53.19%, and the tail end contributed approximately 4.96%. In Match 9, the top order contributed approximately 78.76% to the total score, the middle order contributed approximately 20.54%, and the tail end contributed approximately 0.68%. In Match 10, the top order contributed approximately 63.63% to the total score, the middle order contributed approximately 36.36%, and the tail end did not contribute any points. In Match 11, the top order contributed approximately 83.06% to the total score, the middle order contributed approximately 16.93%, and the tail end did not contribute any points. In Match 12, the top order contributed approximately 80.51% to the total score, while the mid and tail categories did not contribute any points. Based on the contributions, the top order/order contributed the most to the winning in Matches

1, 3, 5, 6, 7, 9, 11, and 12. The mid-order/order contributed the most in Matches 2 and 8, while in Match 4, the mid-order contributed the most.

The study aimed to analyze the performance of Rajasthan Royal batters' contribution towards winning. In the IPL 2022 season, the performance of Rajasthan Royal batters is often a key factor in determining the outcome of a match. The provided data highlights the significant contributions of different batting orders in various matches. The top order consistently emerged as the primary contributor to the total score in Matches 1, 3, 5, 6, 7, 9, 11, and 12, accounting for a substantial percentage of the overall score in these matches. This indicates that the top-order batsmen, who typically occupy the first few positions in the batting line-up, played a crucial role in leading their teams to victory. In Matches 2 and 8, the mid-order took centre stage, contributing the highest percentage to the total score. These findings suggest that the middle-order batsmen, who come in after the top order, demonstrated their ability to shoulder the batting responsibilities and make significant contributions when required. This highlights the importance of a strong and reliable middle order in building and maintaining a competitive score.

On the other hand, the tail end, comprising the lower-order batsmen, generally had minimal impact on the total score across all matches. Their contributions were negligible or non-existent, indicating that the lower-order batters struggled to contribute substantially to the team's overall score. In summary, the findings support the hypothesis that the contribution of batters, particularly those from the top and mid orders, is instrumental in achieving victory in cricket matches. The top-order batsmen consistently played a significant role in setting a solid foundation, while the middle-order batsmen showcased their ability to consolidate and build on that foundation. Meanwhile, the tail-order batsmen, although essential in providing support and extending the innings, had limited impact on the overall score. These insights emphasize the importance of a strong and reliable batting line-up, focusing on the top and middle orders, to secure match success.

8. Conclusions

The following conclusions were drawn within the limitation of the present study: Based on the data, the top order consistently made the highest contribution to the total score in Matches 1, 3, 5, 6, 7, 9, 11, and 12. In Matches 2 and 8, the mid-order contributed the most, while in Match 4, the mid-order made the highest contribution. These findings suggest that the performance of the top and mid-outs plays a crucial role in winning matches. However, it is important to note that the tail-end generally had a minimal contribution to the total score across all matches. This information can support the hypothesis that the contribution of batters, particularly from the top and mid-orders, is essential in achieving victory in the IPL cricket matches.

8.1. Recommendations

Based on the analysis of the batting contributions in the matches, the following recommendations can be made:

- Strengthen the top-order batting: Given the consistent and significant contributions from the top-order in multiple matches, building a strong and reliable top-order batting line-up is crucial. Identifying and nurturing talented batsmen who can provide a solid foundation and score consistently will greatly enhance the team's chances of winning.
- Develop a resilient middle-order: While the middle-order made significant contributions in Matches 2 and 8, it is important to ensure consistency throughout all matches. Investing in developing middle-order batsmen who can handle pressure situations and build on the top-order foundation will give the team a strong core in the batting line-up.
- Support lower-order batsmen: Although the tail category/order had a limited impact on the total score, it is essential to provide support and training to the lower-order batsmen. They are crucial in extending the innings, providing valuable partnerships, and adding vital runs. Strengthening their batting skills and confidence will make the team more well-rounded and improve their overall batting performance.
- Foster partnerships and teamwork: Encouraging partnerships between batsmen from different categories/orders is vital. This ensures a collaborative approach and reduces dependence on specific individuals or categories. Promoting a team-oriented mindset and facilitating effective communication and understanding among the batsmen will enhance the overall batting performance.
- Continuous skill development: Regular skill development programs should be implemented to improve batting performance. This includes focusing on techniques, shot selection, situational awareness, and mental resilience. Providing access to quality coaching and practice facilities will aid in continuously improving the batters' skills and overall performance.

By implementing these recommendations, the team can enhance its batting capabilities, maximize contributions from different categories/orders, and increase the likelihood of winning matches.

8.2. Suggestions for Further Research

Based on the findings of the batting contributions in the matches, the following suggestions can be made for further research:

- Analyze the impact of specific batting techniques: Investigate the influence of different batting techniques on the contributions of each category/order. This research can investigate the effectiveness of aggressive batting, defensive batting, and playing spin or pace. Understanding how specific techniques contribute to different categories/orders can provide insights into optimizing batting strategies.
- Explore the role of match conditions: Investigate how match conditions, such as pitch conditions, weather, and playing conditions, influence the contributions of each batting category/order. Analyzing the performance of batsmen under varying conditions can help identify the types of players who excel in different situations and adapt to different match scenarios.
- Study the impact of player experience and skill level: Assess how the experience and skill level of batsmen in each category/order impact their contributions to the total score. Analyze the batting performance of seasoned players and newcomers to identify patterns or trends related to experience and skill development. This research can help identify strategies to nurture and develop young talent effectively.
- Investigate the influence of team composition and strategies: Explore how the overall composition of the team and the strategic decisions made by the team management impact the contributions of different batting categories/orders. Analyze the effect of team dynamics, player roles, and captaincy decisions on batting performance. This research can provide insights into team-building strategies and captaincy approaches that maximize the contributions of each category/order.
- Examine the psychological aspects of batting performance: Investigate the psychological factors that influence batting performance, such as confidence, decision-making under pressure, and handling expectations. Conducting surveys, interviews, or psychological assessments with batsmen can provide valuable insights into the mental aspects of batting and help identify techniques to enhance mental resilience and performance.

A deeper understanding of the factors influencing batting contributions and strategies can be gained by conducting further research in these areas. These insights can contribute to developing more effective training methods, team selection processes, and strategic decision-making, ultimately improving the team's overall batting performance.

Acknowledgement: The support of all my co-authors is highly appreciated.

Data Availability Statement: Respondent demographics, performance statistics, and work process surveys are in this study. To answer research inquiries, the research includes diagnostic information.

Funding Statement: No funding has been obtained to help prepare this manuscript and research work.

Conflicts of Interest Statement: The author declares no conflicts of interest (s). The information is cited and referenced.

Ethics and Consent Statement: Organizational and participant consent were sought during data collection, along with ethical approval.

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