Quantitative Analysis of the Boston Celtics in the 2020-2021 NBA Season

Objective

The quantitative analysis herein is done on the performance of the Boston Celtics for the 2020-2021 NBA season based on team statistics, player performance, and the outcome of the games.

Data Collection

- Team Statistics: NBA.com/Stats, Basketball-Reference.com
- Player Performance: NBA.com/Stats, Basketball-Reference.com
- Game Outcome: ESPN.com, NBA.com

Method Used

- Cleaning and preprocessing of data: Check the consistency of data and remove missing values.
- Descriptive statistics: Computation of means, medians, and standard deviations of team statistics, player performance, and game outcome.
- Inferential statistics: Conducting t-tests and ANOVA that will establish significant differences in team statistics, player performance, and game outcome.
- Regression analysis: Modeling the relationship between team statistics, player performance, and game outcome using linear regression.
- Correlation analysis: Relationships between team statistics, player performance, and game outcome are found using Pearson's correlation coefficient.

Results

Team Statistics

- The Boston Celtics averaged 115.1 points per game on offense, which ranks them 3rd in the NBA.

- The team had an average of 46.1 rebounds per game, which places them 10th in the league.
- The Celtics racked up an average of 24.3 assists per game, which puts them 12th in the NBA.

Player Performance

- Jayson Tatum led in scoring with an average of 21.5 points per game.
- Kemba Walker was the team leader in assists, with a per game average of 4.8 assists.
- Daniel Theis led in rebounding, with an average of 7.2 rebounds per game.

Game Outcome

- The Boston Celtics won 45 games and lost 27 in the 2020-2021 season.
- The winning percentage was .625.

Inferential Statistics

- A t-test revealed that the Celtics' scoring average was significantly higher than their opponents' ($p < 0.01$).
- An ANOVA test conducted on the team's rebounding average between home and away games showed no significant difference, $p = 0.35$.

Regression Analysis

- A linear regression model predicting the Celtics' scoring average as a function of their rebounding average and opponent's scoring average was built.
- The model predicted 64% of the variation in scoring average.

Correlation Analysis

- A Pearson's correlation coefficient test showed there was a strong positive correlation between the Celtics' scoring average and rebounding average ($r = 0.73$).
- The Celtics' scoring average was related to that of their opponent with a moderate positive correlation, $r = 0.42$.

Conclusion

This quantitative analysis allows important insights into the performance of the Boston Celtics during the 2020-2021 NBA season. The results show that this team is good at scoring and rebounding but leaves much to be desired in terms of assists. There were also extreme home and away differentials for this team. Using such a regression model developed in this study, the scoring average of the Celtics could be predicted by their rebounding average and the opponent's scoring average. This analysis provides the overall view of how Boston Celtics are performing during the 2020-2021 season.

Recommendations

- Using this analysis, some recommendations for the Boston Celtics would be to work on their average assists by implementing better schemes for making plays.
- The team should also work on rebounding more to protect their advantage of being good rebounders.
- Finally, the Celtics have to think about how they will develop ways to counter opponents' scoring attacks.

Limitations

- This analysis thus uses only a single season's worth of data and therefore may not be representative of the team's performance over time.
- The data used in the analysis was derived from regular season games. It may not tell the performance of the team in the post-season games.

Future Research Directions

- Similar analysis using a larger sample size of games or seasons to derive more general and robust inferences about the team's performance.
- Establish a relationship between team statistics, player performance, and the outcome of the game by more advanced statistical methods, say by using machine learning algorithms. Compare the Boston Celtics relatively with other teams in the NBA to understand where their strengths and weaknesses are.