



The Relationship Between Shoots Taken in the Turkish Super League 2020-2021 Season and the End of Season Success Ranking

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ABSTRACT

The aim of the study is to examine the shots taken by the teams finishing in the top 4 and bottom 4 in the Turkish Super League 2020-21 season; To examine the relationship between the parameters of attack style (AS), pass style (PS), shooting action (SA), ball kicking style (BKS), shot zone (SZ) and shooting pass zone (SPZ) and shooting result (SR) with the end-of-season point rankings. As a result, the differences between successful and unsuccessful teams were examined according to the shoots taken and the end-of-season point rankings. In the study, all shots taken by the teams in the top 4 and bottom 4 according to the points ranking in the Turkish Super League 2020-21 season were analyzed.

SPSS 26.0 program was used for statistical analysis. Descriptive statistical methods were used to evaluate the study data. For the normal distribution of the data, the Shapiro Wilk test was applied to check the skewness and kurtosis values. Shots made as a result of the data collected; It was analyzed according to the parameters of attacking style, passing style, ball kicking style, shooting action, shooting results and success situation.

As a result; A statistically significant difference was found between the teams in the first 4 places in the end-of-season points ranking and bottom 4 in the CPB, SZ and SS parameters ($p < 0.05$). As a result, in the light of these data, it can be concluded that the shoot is made with a direct kick from the foot after a open play, from the Outer Lane 1 (OL1) or Inside Lane (IL4) CPBs, from the pass thrown from the ground to the Middle Goal Zone 2 (MGZ2) shooting zone, the shoot increases the goal scoring rate has been determined. It is recommended that training and match plans be planned accordingly.

Keywords: Football, Match Analysis, Shooting Analysis, Shooting Zone, Shooting Pass Zone

INTRODUCTION

In recent years, the integration of technology into football has revolutionized the way the game is analyzed and understood. Advanced systems, including video analysis and tracking technologies, have enabled teams, coaches, and analysts to scrutinize player performance, team strategies, and match dynamics with unprecedented precision. The implementation of these technologies, such as Hawk-Eye and GPS tracking systems, has not only improved the accuracy of refereeing decisions but also enhanced the understanding of critical performance metrics. These innovations have significantly influenced decision-making processes within the sport, allowing for more data-driven approaches to training and match preparation (Carling et al., 2013; Mackenzie & Cushion, 2013).

Match analysis has emerged as a cornerstone in modern football, offering valuable insights into various technical, tactical, and physical aspects of the game. Historically, match analysis relied on manual observations and basic statistics, such as goals scored and possession percentages. However, with the advent of digital technologies and big data, it has evolved into a sophisticated discipline involving detailed metrics like xG (expected goals), heatmaps, and player tracking systems. This evolution has allowed teams to gain deeper insights into performance dynamics and optimize strategies with unprecedented accuracy. By dissecting matches through detailed data collection and evaluation, analysts can identify patterns, strengths, and weaknesses that might otherwise go unnoticed. Parameters such as possession, passing accuracy, and defensive actions are commonly evaluated, yet one of the most decisive aspects of the game remains the effectiveness of goal-scoring opportunities. Studies have consistently highlighted the importance of shot accuracy and conversion rates as key indicators of a team's offensive efficiency and overall success (Lago-Peñas et al., 2010; Hughes & Bartlett, 2002). For example, a recent analysis of the English Premier League revealed that teams converting more than 15%

of their total shots ranked significantly higher in the league compared to those with lower conversion rates (Wunderlich et al., 2021).

A growing body of research has also examined the role of randomness in football outcomes. Wunderlich et al. (2021) analyzed the impact of randomness on goal-scoring in the English Premier League, concluding that while randomness continues to influence outcomes, its impact has decreased over time due to the increasing tactical and technical sophistication of teams. This finding underscores the importance of controlled and measurable parameters, such as shooting accuracy and efficiency, in determining success.

Research on technical shooting parameters has explored factors including shot distance, angle, and velocity, which are critical in determining the likelihood of scoring goals. The relationship between these parameters and a team's season-end ranking offers valuable insights into how shooting proficiency contributes to success in competitive leagues. For instance, Castellano et al. (2012) demonstrated that teams with higher shot accuracy and efficiency were more likely to achieve favorable results over the course of a season. Additionally, recent studies emphasize the integration of machine learning and big data to predict outcomes and refine shooting strategies, further enhancing the precision of performance analysis (Memmert et al., 2021).

This study seeks to bridge a gap in the literature by examining the correlation between shooting parameters and the final league standings in the Turkish Super League during the 2020-2021 season. While previous research has extensively explored the impact of general performance metrics such as possession and passing accuracy, limited attention has been paid to how specific shooting parameters, such as shot type, distance, and accuracy, directly influence seasonal outcomes in competitive leagues. This study aims to address this gap by focusing on these technical aspects within the context of the Turkish Super League. By analyzing the technical aspects of shots taken throughout the season, this research aims to provide a deeper understanding of the determinants of success in football. Such findings are not only relevant for academic inquiry but also hold practical implications for coaches and analysts. Insights derived from this study can inform training strategies, enabling teams to optimize their shooting performance and, consequently, their competitive outcomes. For instance, coaches could utilize the findings to design drills that focus on improving shot accuracy from critical areas on the pitch, while analysts might implement tailored feedback sessions using video analysis to correct technical flaws in real time.

The primary objective of this research is to investigate the extent to which technical shooting parameters are associated with a team's ranking at the end of the season. By doing so, this study aims to contribute to the growing field of performance analysis in football and offer actionable recommendations for practitioners. Ultimately, the findings are expected to enhance the tactical and technical preparations of football teams, providing a data-driven foundation for improving goal-scoring efficiency and overall team performance.

METHOD

Research Group

The population of the study is the total 9252 shots taken in the Turkish Super League (TSL) 2020-2021 football season. The sample of the study is all (3719) shots taken by the teams restricted to success (top 4) and failure (bottom 4) in the end-of-season point ranking in the TSL 2020-2021 football season.

Data Collection

The research data were collected by 2 expert Match and Performance Analysis coaches by watching the match footage from InStat Sport's website '<https://football.instatsscout.com>' and making notes with codes on the data collection chart using pen and paper method.

Research Analysis Criteria

- Attacking Style (AS): Open Play (OP), Set Pieces; Throw-in (T), Corner (C), Free Kick (FK), Penalty (P)
- Pass Style (PS): In the Air (A), Ground (G) and Neutral Ball (NB)
- Shooting Action (SA): Direct Kick (D), Passing the Player (PP).
- Ball Kicking Style (BKS): Foot (F), Header (H), Other (D).
- Shooting Pass Zones (SPZ): KYS, DK1, DK2, DK3, IK1, IK2, IK3, IK4, MK1, MK2, GB, X. For shots that are not preceded by a pass (shots from set-pieces, direct, unclaimed balls and shots after winning a tackle), the passing zone is labelled X.

- Kicking Zone (KZ): KYS, A1, A2, A3, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, D1, D2, D3, D4, E1, E2, E3.
- Shooting Result (SR): Blocked (B), Off target (OFT), Rebound off the Post (ROP), On target (ONT), Score (S).

For the analysis criteria, shooting zones and shooting pass zones were prepared inspired by the literature (Mitrotasios, et al., 2019; Yüksel, et al., 2017).

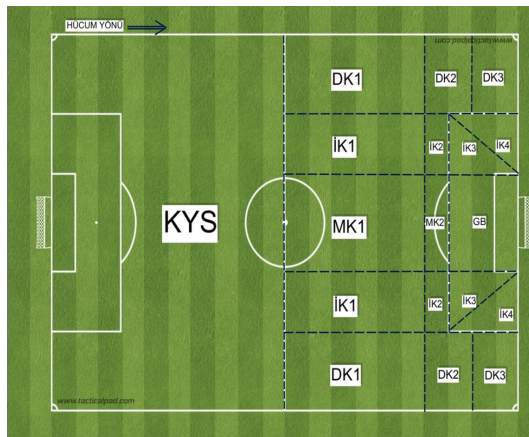


Fig 1. Shooting Pass Zones

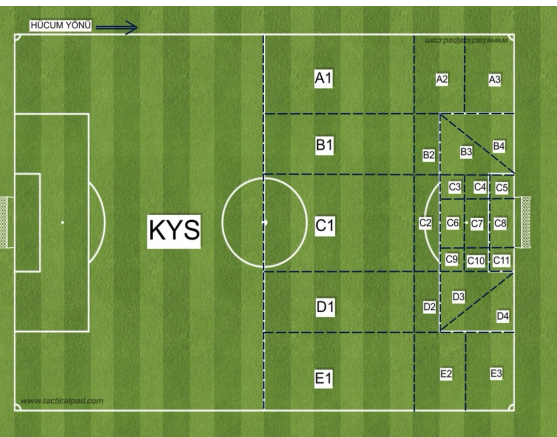


Fig 2. Shooting Zones

Analysis of Data

IBM SPSS 26.0 statistics program was used for statistical analysis of the obtained data. In our study; Chi Square test was applied to test the relationship between AS, PS, SA, BKS, SPZ, SZ and SS parameters and success situation, z test (Benferoni corrected) was applied for independent rates. In statistical tests, $p < 0.05$ was accepted as statistically significant.

FINDINGS

These tables summarize the total shot statistics of teams in a football league and the frequency distribution of shot outcomes. The first table presents the total number of shots for each team based on their ranking, with the highest number of shots recorded by the 3rd team (562 shots) and the lowest by the 21st team (381 shots). The second table details the outcomes of the shots, showing that out of a total of 3,719 shots, 450 resulted in goals, 1,060 were on target, 76 hit the post, 838 were blocked by opponents, and 1,295 were off target. These data provide insights into the efficiency of shots and the offensive performance of the teams.

Table 1. The difference between the top 4 and bottom 4 teams in SSPS in terms of passing style

	X^2	Degrees of Freedom (Df)	P-Values (P)
Pearson Chi-Square	13.166	3	0,004

According to Table 1, as a result of the chi-square test, there is a statistically significant difference between the top 4 and the bottom 4 teams in the end-of-season point ranking in terms of pass style ($p < 0.005$).

Table 2. Frequency distribution of pass style according to success

Passing Style		Success Situation		Total
		Top 4	Bottom 4	
In the Air	N	541 _a	466 _b	1007
	%PS	53,7%	46,3%	100,0%
	%SS	25,5%	29,2%	27,1%
Ground	N	1081 _a	718 _b	1799
	%PS	60,1%	39,9%	100,0%
	%SS	50,9%	45,0%	48,4%
Neutral Ball	N	362 _a	301 _a	663
	%PS	54,6%	45,4%	100,0%
	%SS	17,1%	18,9%	17,8%
Other	N	139 _a	111 _a	250
	%PS	55,6%	44,4%	100,0%
	%SS	6,5%	7,0%	6,7%
Total	N	2123	1596	3719
	%PS	57,1%	42,9%	100,0%
	%SS	100,0%	100,0%	100,0%

%SS: Percent of Success Situation, %PS: Percent of Passing Style, N: Frequency, a: Each subscript letter in PS represents a significant difference in SS at the 0.05 level.

While passes in the air constitute 25.5% of the pass style of the top 4 teams, they constitute 29.2% of the top 4 teams. In terms of ground passes, they constitute 50.9% of the pass preferences of the top 4 teams, and 45% of the bottom 4 teams.

Table 3. The difference between the top 4 and bottom 4 teams in SSPS in terms of ball kicking style

	χ^2	Degrees of Freedom (Df)	P-Values (P)
Pearson Chi-Square	0.615	2	0,735

According to Table 3, as a result of the chi-square test, no statistically significant difference was found between the top 4 and the bottom 4 teams in the end-of-season rankings in terms of ball kicking style ($p>0.05$).

Table 4. Frequency distribution of ball kicking style according to success

Ball Kicking Style		Success Situation		Total
		Top 4	Bottom 4	
Foot	N	1786 _a	1357 _a	3143
	%BKS	56,8%	43,2%	100,0%
	%SS	84,1%	85,0%	84,5%
Header	N	332 _a	236 _a	568
	%BKS	58,5%	41,5%	100,0%
	%SS	15,6%	14,8%	15,3%
Other	N	5 _a	3 _a	8
	%BKS	62,5%	37,5%	100,0%
	%SS	0,2%	0,2%	0,2%
Total	N	2123	1596	3719
	%BKS	57,1%	42,9%	100,0%
	%SS	100,0%	100,0%	100,0%

%SS: Percent of Success Situation, %BKS: Percent of Ball Kicking Style, N: Frequency
a: Each subscript letter in BKS represents a significant difference in SS at the 0.05 level.

There is no statistically significant difference between the top 4 and bottom 4 teams in terms of ball kicking style. The top 4 teams make 84.1% of their shots with their feet, 15.6% with their head and 0.2% with other limbs. The top 4 teams make 85% of their shots with their feet, 14.8% with their heads and 0.2% with other limbs.

Table 5. Difference between the top 4 and bottom 4 teams in SSPS in shooting action

	χ^2	Degrees of Freedom (Df)	P-Values (P)
Pearson Chi-Square	0.067	1	0,795

According to Table 28, as a result of the Chi-square test, no statistically significant difference was found between the top 4 and the bottom 4 teams in the end-of-season point ranking in terms of shooting action ($p>0.05$).

Table 6. Frequency distribution of shooting actions according to success status.

Shooting Actions		Success Situation		Total
		Top 4	Bottom 4	
Direct	N	1591 _a	1202 _a	2793
	%SA	57,0%	43,0%	100,0%
	%SS	74,9%	75,3%	75,1%
Passing the Player	N	532 _a	394 _a	926
	%SA	57,5%	42,5%	100,0%
	%SS	25,1%	24,7%	24,9%
Total	N	2123	1596	3719
	%SA	57,1%	42,9%	100,0%
	%SS	100,0%	100,0%	100,0%

%SS: Percent of Success Situation, %SA: Percent of Shooting Actions, N: Frequency, a: Each subscript letter in SA indicates a significant difference in SS at the 0.05 level.

There is no statistically significant difference between the top 4 and bottom 4 teams in terms of shooting action. The top 4 teams make 74.9% of their shots with direct shots and 25.1% with blocked shoot. The bottom 4 teams make 75.3% of their shots with direct shots and 24.7% with blocked shoot.

Table 7. The difference between the top 4 and bottom 4 teams in the SSPS in shooting range.

	X ²	Degrees of Freedom (Df)	P-Values (P)
Pearson Chi-Square	69.229	25	0,000

According to Table 7, as a result of the Chi-square test, there is a statistically significant difference between the top 4 and the bottom 4 teams in the end-of-season rankings in terms of shooting zones (p<0.005).

Table 8. Frequency distribution of shooting zones according to success situation.

Shooting Zone	Success Situation			Total	Shooting Zone	Success Situation			Total	Shooting Zone	Success Situation			Total
	Top 4	Bottom 4				Top 4	Bottom 4				Top 4	Bottom 4		
KYS	N	0 _a	5 _b	5	C2	N	315 _a	192 _b	507	C11	N	31 _a	27 _a	58
	%SZ	0,00%	100,00%	100,00%		%SZ	62,10%	37,90%	100,00%		%SZ	53,40%	46,60%	100,00%
	%SS	0,00%	0,30%	0,10%		%SS	14,80%	12,00%	13,60%		%SS	1,50%	1,70%	1,60%
A1	N	1 _a	2 _a	3	C3	N	64 _a	44 _a	108	D1	N	50 _a	55 _b	105
	%SZ	33,30%	66,70%	100,00%		%SZ	59,30%	40,70%	100,00%		%SZ	47,60%	52,40%	100,00%
	%SS	0,00%	0,10%	0,10%		%SS	3,00%	2,80%	2,90%		%SS	2,40%	3,40%	2,80%
A2	N	10 _a	8 _a	18	C4	N	87 _a	63 _a	150	D2	N	75 _a	81 _b	156
	%SZ	55,60%	44,40%	100,00%		%SZ	58,00%	42,00%	100,00%		%SZ	48,10%	51,90%	100,00%
	%SS	0,50%	0,50%	0,50%		%SS	4,10%	3,90%	4,00%		%SS	3,50%	5,10%	4,20%
A3	N	5 _a	3 _a	8	C5	N	55 _a	21 _b	76	D3	N	14 _a	12 _a	270
	%SZ	62,50%	37,50%	100,00%		%SZ	72,40%	27,60%	100,00%		%SZ	52,60%	47,40%	100,00%
	%SS	0,20%	0,20%	0,20%		%SS	2,60%	1,30%	2,00%		%SS	6,70%	8,00%	7,30%
B1	N	55 _a	50 _a	105	C6	N	131 _a	90 _a	221	D4	N	23 _a	29 _a	52
	%SZ	52,40%	47,60%	100,00%		%SZ	59,30%	40,70%	100,00%		%SZ	44,20%	55,80%	100,00%
	%SS	2,60%	3,10%	2,80%		%SS	6,20%	5,60%	5,90%		%SS	1,10%	1,80%	1,40%
B2	N	118 _a	63 _b	181	C7	N	285 _a	207 _a	492	E1	N	1 _a	6 _b	7
	%SZ	65,20%	34,80%	100,00%		%SZ	57,90%	42,10%	100,00%		%SZ	14,30%	85,70%	100,00%
	%SS	5,60%	3,90%	4,90%		%SS	13,40%	13,00%	13,20%		%SS	0,00%	0,40%	0,20%
B3	N	177 _a	119 _a	296	C8	N	69 _a	31 _b	100	E2	N	2 _a	13 _b	15
	%SZ	59,80%	40,20%	100,00%		%SZ	69,00%	31,00%	100,00%		%SZ	13,30%	86,70%	100,00%
	%SS	8,30%	7,50%	8,00%		%SS	3,30%	1,90%	2,70%		%SS	0,10%	0,80%	0,40%
B4	N	17 _a	19 _a	36	C9	N	58 _a	44 _a	102	E3	N	7 _a	8 _a	15
	%SZ	47,20%	52,80%	100,00%		%SZ	56,90%	43,10%	100,00%		%SZ	46,70%	53,30%	100,00%
	%SS	0,80%	1,20%	1,00%		%SS	2,70%	2,80%	2,70%		%SS	0,30%	0,50%	0,40%
C1	N	252 _a	207 _a	459	C10	N	93 _a	81 _a	174	Total	N	2123	1596	3719
	%SZ	54,90%	45,10%	100,00%		%SB	53,40%	46,60%	100,00%		%SZ	57,10%	42,90%	100,00%
	%SS	11,90%	13,00%	12,30%		%SS	4,40%	5,10%	4,70%		%SS	100,00%	100,00%	100,00%

%SS: Percent of Success Situation, %ZB: Percent of Shooting Zone, N: Frequency, a: Each subscript letter in SZ represents a significant difference in SS at the 0.05 level.

A significant difference was found according to the success status in the shooting zone kys, b2, c2, c5, c8, d1, d2, e1 and e2. While the shots taken by the top 4 teams from b2 constituted 5.6% of all shots, it constituted 3.9% of the bottom 4 teams. While the shots taken by the top 4 teams from c2 constituted 14.8%, it constituted 12% of the bottom 4 teams. While the shots taken by the top 4 teams from c5 constituted 2.6%, it constituted 1.3% of the bottom 4 teams. While the shots taken by the top 4 teams from c8 constituted 3.3%, it constituted 1.9% of the bottom 4 teams. While the shots taken by the top 4

teams from kys constituted 0.3%, it constituted 0% of the top 4 teams. While the shots taken from kys of the bottom 4 teams constitute 0.3%, it constitutes 0% of the top 4 teams. While the shots taken from d1 of the bottom 4 teams constitute 3.4%, it constitutes 2.4% of the top 4 teams. While the shots taken from d2 of the bottom 4 teams constitute 5.1%, it constitutes 3.5% of the top 4 teams. While the shots taken from e1 of the bottom 4 teams constitute 0.4%, it constitutes 0% of the top 4 teams. While the shots taken from e2 of the bottom 4 teams constitute 0.8%, it constitutes 0.1% of the top 4 teams.

Table 9. The difference between the top 4 and bottom 4 teams in SSPS based on shooting results.

	X ²	Degrees of Freedom (Df)	P-Values (P)
Pearson Chi-Square	9.510	4	0,049

According to Table 9, as a result of the Chi-square test, there is a statistically significant difference between the top 4 and the bottom 4 teams in the end-of-season point ranking in terms of shooting results ($p < 0.05$).

Table 10. Frequency distribution of shot results according to success situation

Results		Success Situation		Total
		Top 4	Bottom 4	
Score	N	285 _a	165 _b	450
	%SR	63,3%	36,7%	100,0%
	%SS	13,4%	10,3%	12,1%
On Target	N	603 _a	457 _a	1060
	%SR	56,9%	43,1%	100,0%
	%SS	28,4%	28,6%	28,5%
Rebound off the Post	N	45 _a	31 _a	76
	%SR	59,2%	40,8%	100,0%
	%SS	2,1%	1,9%	2,0%
Blocks	N	477 _a	361 _a	838
	%SR	56,9%	43,1%	100,0%
	%SS	22,5%	22,6%	22,5%
Off Target	N	713 _a	582 _a	1295
	%SR	55,1%	44,9%	100,0%
	%SS	33,6%	36,5%	34,8%
Total	N	2123	1596	3719
	%SR	57,1%	42,9%	100,0%
	%SS	100,0%	100,0%	100,0%

%SS: Percent of Success Situation, %SR: Percent of Shooting Result, N: Frequency
a: Each subscript letter in SR indicates a significant difference in SS at the 0.05 level.

A significant difference was found in the success of the shots taken in terms of the result of the score. While 13.4% of the shots taken by the top 4 teams result in a score, 10.3% of the shots taken by the bottom 4 teams result in a score. There is a difference between the rates of shots taken by the top 4 and bottom 4 teams being missed; 36.5% of the shots taken by the bottom 4 teams are missed, while 33.6% of the top 4 teams are missed.

DISCUSSION AND CONCLUSION

This study has revealed significant findings by examining the relationship between football teams' shooting and passing strategies and their performance success. The findings demonstrated meaningful differences between teams ranked in the top 4 and the bottom 4. In this section, the main findings are discussed within the framework of football literature and practical applications.

The findings indicated that teams ranked in the top 4 had significantly higher ground pass rates (50.9%) compared to the bottom 4 teams (45.7%) ($p < 0.005$). This suggests that successful teams focus more on ball control and adopt lower-risk strategies to maintain the flow of the game. In the literature, it has been emphasized that ground-pass strategies reduce turnovers, supporting more effective and sustainable attacks (Anderson & Sally, 2020; Lago et al., 2010). The increased reliance on aerial passes

by the bottom 4 teams could result from efforts to escape defensive pressure. This finding aligns with research suggesting that ground passing strategies are becoming increasingly important in modern football (Bradley et al., 2013).

No significant differences were found between the top 4 and bottom 4 teams in terms of ball striking techniques (e.g., foot, head) or shooting actions (e.g., direct shots or shots following dribbling) ($p > 0.05$). This suggests a general standardization in shooting strategies among successful teams. However, other factors influencing shooting accuracy—such as player skill, team positioning on the field, and the structure of the opposing defense—may play a more prominent role in explaining these differences (Hughes et al., 2012; Rampinini et al., 2007). The reduction of such strategic differences among teams competing in high-level leagues may reflect the globalization and standardization of football (Carling et al., 2005).

This study demonstrated that successful teams were more strategic in their assist passes and shooting zones. Teams in the top 4 adopted a more effective playing style by utilizing dangerous areas ($p < 0.05$). Specifically, teams taking shots from more favorable positions such as B2 and C8 emphasize this method as a key to success. According to the literature, shooting efficiency is generally directly related to finding appropriate positions within the penalty area (Almeida et al., 2014; Wright et al., 2011). Additionally, the ability of successful teams to capitalize on defensive errors is considered another factor contributing to shooting efficiency (Sarmiento et al., 2018).

This study highlighted the preferences of successful football teams in passing strategies and shooting zones, offering significant implications for coaches and sports scientists. The findings particularly emphasize the positive effects of ground pass strategies on game efficiency. Future studies could focus on shot accuracy and goal success to enable a more detailed evaluation of these strategies. Furthermore, comparative studies examining playing styles across different leagues would contribute to the generalizability of the findings. For example, analyses considering the physical and technical demands of various leagues could help better understand the adaptation processes of game strategies (Gómez et al., 2013).

RECOMMENDATIONS

Focus on Goal Conversion Rates: Future research could examine how different passing and shooting strategies impact goal conversion rates, providing deeper insights into the effectiveness of specific tactics.

Cross-League Comparisons: Conducting comparative studies across leagues with varying technical and physical demands could reveal how contextual factors influence strategic preferences.

Advanced Metrics Analysis: Utilizing advanced performance metrics, such as expected goals (xG) and possession efficiency, may help quantify the success of different strategies more accurately.

Longitudinal Studies: Analyzing changes in team strategies over multiple seasons could offer a better understanding of tactical evolution in response to competition and rule changes.

Player-Specific Contributions: Investigating how individual player skills, such as passing accuracy and shooting precision, contribute to team success could provide targeted training recommendations.

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