

Regional Analysis of the Shots in the Football Matches Played in the 2018 FIFA World Cup and Their Effect on Success

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ABSTRACT

Aim: The purpose of this study is to analyze the shots taken in 64 football matches played in the 2018 FIFA World Cup. **Methods:** Shots taken in 64 matches played with the participation of 32 teams in the FIFA 2018 World Cup were included in the study. 170 of the 1595 shots targeted the goal resulted in goals, but the goals scored with the head, scored on team's own goal, scored from the penalty and dead ball were not included in these numbers. The teams that finished the Cup in the top 3 places were evaluated as successful and the teams that could not enter the top 3 were considered as unsuccessful. The data obtained were evaluated for the successful/ unsuccessful teams in terms of 1) Total shots, total shots on target/off-target, 2) on/off-target shots taken inside/outside the penalty area, 3) Goals scored inside/outside the penalty area. The manual notation (paper-pencil) method was used to collect the data. SPSS 21 package program was used for statistical analyses. The normal distribution evaluations of the data were made with the Shapiro - Wilk test. As the data the data were not normally distributed Mann-Whitney U test was used in the statistical analysis of the data ($p < 0.05$).

Results: According to the results, successful teams' total shots, total shots on target/off-target, goal, on/off-target shots taken inside/outside the penalty area, goals scored from total on-target shots, on target shot goals inside/outside penalty area, shots on target ratio taken inside/outside the penalty area, are higher than the unsuccessful teams, and a statistically significant difference was determined between the two groups ($p < 0.05$). As a result, successful teams shot more inside and outside the penalty area than unsuccessful teams. Therefore, they had a higher on-target shot rate both inside and outside the penalty area.

Conclusion: Consequently, they scored goals at higher rates. In the 2018 World Cup, a higher rate of goals was scored inside the penalty area compared to the outside of the penalty area. For these reasons, in both defense and goal organizations, training should be planned by paying attention to these points.

Keywords: Goal, Match Analysis, Shot, World Cup

INTRODUCTION

Football is a team sport played under certain rules, where the result is determined by the goals scored or conceded ¹. Today's football was developed by the English in the 19th century. It has become the most popular sports branch in the 20th century spreading all over the world and having the biggest fan base ². Football, which has an important place in today's world, has become an industry with its audience and media superiority ³. The World Cup in football is undoubtedly one of the largest organizations in the world. The world cup provides the audience with the opportunity to compare the best teams and players in the world. At the end of the World Cup, which results in a big final, the game and player profiles of successful teams are evaluated and the performance parameters underlying the success are analyzed ⁴.

Analysis methods based on scientific foundations have become very important in today's football. Football clubs which are not only teams, but incorporations with large budgets, need to take advantage of the opportunities of technology to exist in this field. From this point of view, it is obvious that match analysis is an important performance evaluation method to evaluate football field performance and to be successful ⁵. In the analysis of technical elements for evaluating performance parameters, some alternative methods were used to keep a ninety-minute game in memory during a match. Among these methods are the paper-pencil method and computer-video analysis by which all the behaviors of a football player are accurately and

objectively analyzed and recorded ⁴. Technical analysis in team sports is a tool that offers significant convenience for coaches in preparing training and match plans. The match performance efficiencies of the players in the team can be influential in the decision making process regarding the goals and strategies of the coaches through the statistical information created ⁶. Match analysis provides data on the individual or team performances of each player who is part of the team. Many studies report that in team sports there is a strong relationship between team performance and success. Coaches can employ tactical variations by evaluating the performance of their players and team by combining their own ideas with the information obtained from the match analysis before and during the match ⁷.

In today's football, many new variables affect the outcome of the match. Today, technology is more involved in football, and football teams are doing great works build upon winning criteria. Teams that use every aspect of technology and science with a desire to win perform different shooting methods and practices, train the football players individually, and make technical tactical analyses to improve the performance of the football players and to increase the percentage of shooting success. Shooting technique of football players, shooting force and their biomechanical investigations, simulation during the game, shooting distance measurements, field-based shooting variations are among the studies. All these studies form the basis of an offensive philosophy which has the principle of winning by planning training as a team and individually ⁸. When the literature was reviewed, a study conducted in the

UEFA Champions League among the winning and losing teams, concludes that average rates of total shots, shots that hit the target, passes and successful shots of the teams that won the matches are higher and statistically significant at the same time⁹. Erdil et al. (2013) concluded that the Spanish national team, which won the 2010 World Cup, took twice as many shots as its opponents¹⁰.

In another study that compared some of the performance parameters of the first nine and last nine ranked teams in the 2016-2017 season of the Turkish Super League, the mean of goals, successful shots, and the balls thrown to the attack zone were observed to be higher¹¹. In a similar study in which the winning and losing teams in the 2010 World Cup were compared, it was concluded that the average rates of the winning teams' goals, shots and shots that hit the target were higher¹². Göral (2015) observed that successful teams at the World Cup had a high percentage of pass and shot success¹³. Based on the above information, this study aims to reveal the differences between successful and unsuccessful teams by analyzing the shots taken from inside/outside the penalty area (PA) in 64 games played in the 2018 FIFA World Cup.

MATERIAL & METHODS

Design: The study includes the shots taken in 64 games played among 32 teams in the 2018 FIFA World Cup. 170 of the 1595 shots on the goal resulted in a goal, but the goals scored with the head, scored on the team's own goal, scored from the penalty and dead ball were not included in

these numbers. The teams that finished the Cup in the top 3 places were counted as successful and the teams that could not enter the top 3 were considered as unsuccessful. The data obtained were evaluated for the successful/unsuccessful teams in terms of 1) total shots, total shots on target/off target, goals 2) on/off target shots taken inside/outside the penalty area, 3) Total on target shot goal rate, on target shot goal rate scored inside/outside the penalty area.

Data Collection: The data used in this research was obtained with manual rotation by the same researcher who watched the matches of the teams in the 2018 FIFA World Cup (64 games) live or recorded. The paper-pencil method includes recording the movements performed in a football match (live or recorded) such as passing the ball, dribbling, crossing the ball, shooting, blocking, obstruction, clearing the ball, saving a goal, and possession of the ball together with the relevant player, field and time parameters using the hand notation technique, and transferring the statistical data to the excel template¹⁴. The present study was approved by the University Ethics Committee of Bilecik Şeyh Edebali University (2018 / 43-4).

Statistical Analysis:

The normal distribution evaluations of the data were made with the Shapiro-Wilk test. As the data the data were not normally distributed Mann Whitney U test was used in the statistical analysis of the data ($p < 0.05$). The Arithmetic mean, standard deviation and percentage values of the data obtained in the study were also presented.

RESULTS

The data obtained from the present study conducted in order to reveal the differences between successful and unsuccessful teams by analyzing the shots taken from inside/outside the penalty area in 64 matches in the 2018 FIFA World Cup is presented below.

Table 1: Total Shots, Shots on/off Target, Goal Parameters of Successful and Unsuccessful Teams

Variables		\bar{x}	sd	min.	max.	p
Total Shot	Successful	96.00	16.09	81	113	0.00*
	Unsuccessful	45.07	20.06	23	94	
Shot on-target	Successful	31.33	4.04	29	36	0.00*
	Unsuccessful	13.86	6.41	4	29	
Shot off-target	Successful	64.67	17.01	52	84	0.01*
	Unsuccessful	31.07	14.30	15	66	
Goal	Successful	14.00	0.00	14	14	0.00*
	Unsuccessful	4.41	2.82	2	12	

* $p < 0.05$

Table 1.1: Shots inside/outside the penalty area, shots on/off target inside/outside the penalty area, parameters of the successful and unsuccessful teams

Variables		\bar{x}	sd	min.	max.	p
Shot inside the PA	Successful	50.00	0.00	50	50	0.01*
	Unsuccessful	26.10	13.30	10	62	
Shot outside the PA	Successful	31.00	0.00	31	31	0.04*
	Unsuccessful	18.96	8.58	7	40	
Shot on target inside the PA	Successful	15.67	4.04	12	20	0,03*
	Unsuccessful	8.10	4.30	2	15	
Shot off target inside the PA	Successful	39.00	9.64	32	50	0,01*
	Unsuccessful	17.65	9.64	8	47	
Shot on target outside the PA	Successful	15.67	7.64	9	24	0,01*
	Unsuccessful	5.76	3.13	2	14	
Shot off target outside the PA	Successful	25.67	8.50	17	34	0,00*
	Unsuccessful	13.21	6.63	5	30	

* $p < 0.05$

When Table 1 was examined, a statistically significant difference was found in favor of the successful teams in terms of the total shots, shots off-target and goal parameters ($p < 0.05$). Average shot, shot on/off target, and goal rates of the successful teams are found to be higher.

Table 1.2: Rates of Total on Target Shot Goal, Inside the Penalty Area on Target Shot Goal, Outside the Penalty Area on Target Shot Goal parameters of the successful and unsuccessful teams

Variables		\bar{x}	sd	min	max	p
Total On Target Shot Goal Rates	Successful	14.00	0.00	14	14	0.00*
	Unsuccessful	4.41	2.82	2	12	
On Target Shot Goal Rates Inside The PA	Successful	7.66	3.21	4	10	0.02*
	Unsuccessful	2.72	1.98	1	9	
On Target Shot Goal Rates Outside The PA	Successful	6.33	3.21	4	10	0.00*
	Unsuccessful	1.69	1.28	0	4	

* $p < 0.05$

Table 1.3: The Comparison of the Number of Shots On / Off Target, Total Shots Inside the Penalty Area, Total Shots Outside the Penalty Area Parameters of the Successful-Unsuccessful Teams with the Total Shots

Variables	Total Shots	Total Shots On Target	%	Total Shots Off Target	%	Total Shots Inside The PA	%	Total Shots Outside The PA	%
Successful	288	94	32.64	194	67.36	164	58.94	124	43.06
Unsuccessful	1307	402	30.85	905	69.15	757	57.92	550	42.08

Table 1.4: The Rate of On / Off Target Shots Taken by the Successful-Unsuccessful Teams Inside and Outside the Penalty Area

Variables	Total Shots	On Target	%	Off Target	%	
Successful	Shots taken Inside The PA	164	47	37.90%	117	62.10%
	Shots taken Outside The PA	124	47	28.66%	77	71.34%
Unsuccessful	Shots taken Inside The PA	757	235	31.04%	512	67.63%
	Shots taken Outside The PA	550	167	30.37%	383	69.63%

Table 1.5: The Comparison of the Number of the Total Shots Inside and Outside the Penalty Area, Shots on Target and Goal of the

Variables	Shots	%	Goal	%	
Successful	Total Shots On Target	94	100.00	42	44.68
	Shots On Target Inside the PA	47	50.00	23	48.94
	Shots On Target Outside the PA	47	50.00	19	40.42
Unsuccessful	Total Shots On Target	402	100.00	128	31.84
	Shots On Target Inside the PA	235	58.46	79	33.62
	Shots On Target Outside the PA	167	41.54	49	29.34

Successful-Unsuccessful Teams with the Total Shots on Target

As presented in Table 1. 1., a statistically significant difference was found between two groups according to the parameters of shots taken inside / outside the penalty area, shots on / off target inside the penalty area ($p < 0.05$). In the matches, the averages of shots taken inside / outside the penalty area, shots on / off target inside the penalty area and shots on / off target outside the penalty area are higher.

As indicated in Table 1.2, a statistically significant difference was found between the successful and unsuccessful teams in terms of rates of total on target shot goal, inside the penalty area on target shot goal, outside the penalty area on target shot goal ($p < 0.05$). In the matches, the average of the teams' total on target shot goal rates, shot goal rates inside the penalty area, and shot goal rates outside the penalty area is higher.

Table 1. 3 displays that successful teams took a total of 288 shots. 94 of these shots were on target (32.64%) and 194 were off target (67.36%). 164 (58.94%) of 288 shots were taken inside the penalty area and 124 (43.06%) were taken outside the penalty area. Unsuccessful teams took a total of 1307 shots. 402 of these shots were on target (30.85%) and 905 were off target (69.15%). 757

(57.92%) of 1307 shots were taken inside the penalty area and 550 (42.08%) were taken outside the penalty area.

Table 1. 4. Displays that 47 (37.90%) of the total 164 shots taken from the penalty area were on target and 117 (62.10%) were off target., 47 (28.66%) of 124 shots taken outside the penalty area were on target, and 77 (71.34%) of them were off target. 235 (31.04%) of the 757 shots of the unsuccessful teams taken from the penalty area are on target, and 512 shots (67.63%) were off target. 167 (30.37%) of the total 550 shots taken outside the penalty area were on target and 383 (69.63%) were off target.

Table 1. 5 indicates that 42 (44.68%) of the total 94 shots on target (100.00%) taken by successful teams were scored. While 23 (48.94%) out of 47 (50.00%) of these shots on target, inside the penalty area were scored, 19 (40.42%) out of the 47 (50.00%) of these shots on target, outside the penalty area were scored. The table shows that 128 (31.84%) out of the total 402 shots on target (100.00%) by unsuccessful teams were scored. While 79 (33.62%) out of 235 shots (58.46%) of these shots on target, inside the penalty area were scored, 49 (29.34%) out of the 167 (41.54%) of these shots on target, outside the penalty area were scored.

DISCUSSION

The aim of this study is to analyze the shots taken inside and outside the penalty area in comparison with successful and unsuccessful teams in 64 football matches played in the 2018 World Cup. The data obtained from successful and unsuccessful teams indicated that total shots, total shots on target / off target, goals, on / off target shots taken inside / outside the penalty area, total on target shot goal rate, on target shot goals scored inside / outside the penalty area, the rate of on target shot goals taken inside / outside the penalty area by the successful teams are higher than the unsuccessful teams, and the difference between these two groups was found statistically significant ($p < 0.05$) (Table 1, Table 1.1, Table 1.2). While the successful teams had 32.64% shots on target, 58.94% shots taken inside the penalty area, 43.06% shots taken outside the penalty area (Table 1.3), 37.90 % shots on target taken inside the penalty area, 28.66 % shots on target taken outside the penalty area (Table 1.4), 44.68 % goals scored from the total shots on target, 48.94 % goals scored from the shots on target taken inside the penalty area, 29.34 % goals scored from the shots on target taken outside the penalty area (Table 1.5); the unsuccessful teams had 30.85 % shots on target, 56.92 % shots taken inside the penalty area, 42.08 % shots taken outside the penalty area (Table 1.3), 31.46 % shots on target taken inside the penalty area, 30.37 % shots taken outside the penalty area (Table 1.4), 31.84 % goals scored from the total shots on target, 33.62 % goals scored from the shots on target taken inside the penalty area, 29.34 % goals scored from the shots on target taken outside the penalty area (Table 1.5).

Percentages of shots on target in the last 4 World Cups are as the following: 42.26% in 1998, 41.22% in 2002, 41.97% in 2006 and 39.72% in 2010¹⁵⁻¹⁶. Bordonau et al. (2013) stated that in the 2010 World Cup, the total shot averages of successful teams were 14.8, and of the unsuccessful teams were 12.3, the average rate of shots on target of successful teams were 6.3, and of the unsuccessful teams were 4.1, the shot success rates of successful teams were 43.4% and of the unsuccessful teams were 32.6%¹². Castellano et al. (2012) found that the teams that won the matches in the 2002, 2006, 2010 World Cups had higher average rates of goals, shots and shots hitting the target than the teams who lost the matches¹⁷.

In the 2014 FIFA World Cup, it was observed that the effect of taking more shots to the goal to win the matches was 13%, and the effect of number of shots hitting the goal to win the matches was 48%¹⁸. Sajadi and Rahmana (2007) in their study that analyzed the goals in the 2006 World Cup found that 61% of the goals were scored with direct shots and 47% of them were scored with shots on target¹⁹. The researchers stated that the winning teams' took more shots made significant differences when both of winning and losing teams considered. In a study examining the factors affecting the season-end rank of the teams in 2012-2013 Spor Toto Super League, it was concluded that the number of shots of the teams at the top of the league was higher than the number of shots of the teams in the bottom of the league²⁰.

Işık (1999) determined that 84.1% of the goals scored in the 1996 European Football Championship were in the penalty area²¹. In a study conducted by Usher (2014), 1393 shots were examined in 100 matches played in the English Premier League 1 in the 2012-2013 season²², and the rate of the on target shots taken in the penalty area was 45%. Çakıroğlu (2005) examined the shooting regions in successful attacks in the matches in the Turkey Super League and the Champions League and reported that in the Turkey Super League the rate of shots taken inside the penalty area was higher (56%) than the shots taken outside the penalty area, while in the Champions League the rate of shots taken outside the penalty area was higher (54%) than the shots taken inside the penalty area²³. Ballesteros et al. (2010) in their study on the Spanish league found that the shooting percentage of the top 4 teams as 16.25²⁴. Similarly, Bradley et al. (2013) examined the shooting percentage of the top 4 teams in the English league and found it as 16.25²⁵. In his study, Göral (2015) stated that the German National football team, which was the champion in the 2014 FIFA World Cup, took 13.9 shots per game and 10.1 (73.2%) of these shots scored a goal¹³.

Barreira et al. (2016) stated that the teams that won the matches in the 2014 Brazilian Championship league had higher total shots and the shots that hit the target compared to the teams that lost the matches²⁶.

In another study carried out in the Chinese Super League in the 2012-2017 seasons, it was concluded that the teams that won the competitions had higher average rates of shots and shots hitting the target than the teams who lost the games²⁷. In their study, Lago-Penas et al. (2012) analyzed 380 matches that took place in the Spanish Professional Football League in 2008-2009. They found out that the winning teams took more shots and shots on target than the losing teams and had a higher percentage rate²⁸. The findings of the present study bear similarities with other studies when results of the matches of the successful teams were examined. Successful teams have higher averages and percentages in both World Cup and league competitions than unsuccessful teams²⁹. Studies investigating the 2014 World Cup reported that the successful teams scored more goals³⁰⁻³¹. Yiannakos and Armatos (2006) stated that 44.4% of the goals were scored inside the penalty area in 2004 European Football Championship³². In the 1998 World Cup, 87.1% of the goals were scored inside the penalty area while 12.9% of the goals were scored outside the penalty area³³. When the attacks that resulted in a goal in the UEFA Champions League were examined, it was determined that the goals were mostly scored in the penalty area in the 2004-2005 (76.4%), 2005-2006 (77.5%) and 2006-2007 (77%) seasons³⁴.

In a study that analyzed the 2012 European Football Championship, it was concluded that the average score of the teams that won the competitions was 2.17, the teams that lost the games was 0.58, the average shots of the teams that won the matches was 5.75, and the teams who lost the games was 3.38³⁵. In a study in which the 2014 World Cup Champion German national team was analyzed, it was observed that the German team played with an average of 2.57 goals and that the team has not conceded any goal in the first half of the matches³⁶. In a study that

compared the teams that won and lost the competitions in the World Cups, it was concluded that the teams that won the matches had an average of 2.2 and the teams who lost the matches had 0.4 average. Also, in another study examining the differences between the winning and losing teams at 2002, 2006 and 2010 World Cups, it was stated that the winning teams scored more goals than the losing teams¹⁷. Considering the results of the present study, successful teams have higher goal ratios than unsuccessful teams [goals from total shots on target (44.68%, 31.84% respectively), goals scored with shots on target inside the penalty area (48.94%, 33.62% respectively), goals scored with shots on target outside the penalty area (respectively, 40.42%, 29.34%)], and when the literature is reviewed, it shows similarities with other studies in terms of the above mentioned superiority.

CONCLUSION

In football, there are many performance parameters required to achieve successful performance in organizations where high-level competitions such as the World Cup are played. When the performance parameters are considered in the current study, the total shots on target, goals, the total shots taken inside and outside the penalty area, the shots on target taken inside and outside the penalty area, the goal rate of the shots, total shot goal ratio is taken inside and outside the penalty area, the shot on target ratio taken inside and outside the penalty area of the successful teams (France, Croatia, Belgium) are higher than the unsuccessful teams. As a result, successful teams shot more inside and outside the penalty area than the unsuccessful teams. Therefore, they had a higher shot rate both inside and outside the penalty area. As a result, they scored more. In the last World Cup, a higher rate of goals were scored inside the penalty area compared to the outside of the penalty area. For these reasons, in both defense and goal organizations, training should be planned by paying attention to these points.

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