


Investigation of the Effect of Technical and Physical Performance on Success in Elite Level Women's Soccer

Elit Seviye Kadın Futbolunda Teknik ve Fiziksel Performansın Başarı Üzerindeki Etkisinin İncelenmesi

Research Article / Araştırma Makalesi

 Gizem BAŞKAYA¹

 Erdi TOKUL²

¹ Bandırma Onyedü Eylül University,
Faculty of Sport Sciences, Balıkesir, TÜRKİYE

² Avrasya University,
Faculty of Sport Sciences, Trabzon, TÜRKİYE

Corresponding Author / Sorumlu Yazar
Asst. Prof. Gizem BAŞKAYA
gbaskaya@bandirma.edu.tr

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Abstract

The aim of this study is to reveal the differences in the technical, physical and tactical performances of the countries participating in the 2023 FIFA Women's World Cup and their impact and relationship on the success of the tournament. 14 technical-tactical and 2 physical performances, 16 parameters in total were evaluated. As a result of the analyses, statistically significant differences were found between the number of goals scored, the number of goals conceded, the number of shots on goal, the number of possession in the final third and the number of corners used by the countries that reached the last 16 and the countries that failed to advance to the next round. At the end of the quarter-final matches, no statistically significant difference was found between the performances of the countries that advanced to the semi-finals and the countries that were eliminated. There is a moderate to high positive correlation between the percentage of possession, total and accurate number and percentage of passes, attempts at goal, attempts at goal on target, completed line breaks and interceptions in the final third and total number of goals for the countries that won the competition in the tournament. As a result, it can be said that physical performances are similar in elite level women's soccer, but teams that have more possession of the ball and are willing to take advantage of opportunities to score goals can make a difference.

Keywords: Soccer, Goal, Women, Running Distance, World Cup

Öz

Bu çalışmanın amacı, 2023 FIFA Kadınlar Dünya Kupası'nda yer alan ülkelerin teknik, fiziksel ve taktik performanslarındaki farklılıkları ve bunların turnuva başarısı üzerindeki etkisini ve ilişkisini ortaya koymaktır. 14 teknik, taktik ve 2 fiziksel performans, toplamda 16 parametre değerlendirilmiştir. Analizler sonucunda, son 16'ya kalan ülkeler ile bir üst tura çıkamayan ülkelerin attıkları gol sayısı, yedikleri gol sayısı, kaleyi bulan şut sayısı, son üçte birlik alanda topa sahip olma sayısı ve kullandıkları korner sayısı arasında istatistiksel olarak anlamlı farklılıklar bulunmuştur. Çeyrek final maçları sonunda yarı finale yükselen ülkeler ile elenen ülkelerin performansları arasında istatistiksel olarak anlamlı bir fark bulunmamıştır. Turnuvada müsabakayı kazanan ülkeler için topa sahip olma yüzdesi, toplam ve isabetli pas sayısı ve yüzdesi, kaleyi bulan şutlar, kaleyi bulan şutlar, tamamlanan çizgi araları ve son üçte birlik alanda yapılan müdahaleler ile toplam gol sayısı arasında orta ve yüksek düzeyde pozitif bir korelasyon bulunmaktadır. Sonuç olarak, elit düzey kadın futbolunda fiziksel performansların benzer olduğu söylenebilir, ancak topa daha fazla sahip olan ve gol atma fırsatlarını değerlendirmeye istekli olan takımlar fark yaratabilir.

Anahtar Kelimeler: Futbol, Gol, Kadın, Koşu Mesafesi, Dünya Kupası

Introduction

Modern soccer is characterized by its high intensity, volume, aggressive nature, long duration and demanding physical and technical requirements (Cao, Zhao, Tang, Fan & Zereg, 2023) and match performance is determined by the interaction of multiple factors such as physical, tactical and technical (Sarmiento et al., 2014). Performance in soccer is essentially tactical. Performance is determined by the proper coordination of players' behavior on the playing field, and the application of technical skills to complete the basic actions of the game complements this movement, which largely determines the physical response of athletes' Performance (Randell et al., 2021).

Studies have reported that competition physical and technical performance in professional soccer has increased in the last decade (Bradley et al., 2016; Reynolds, Connor, Jamil & Beato, 2021). Some of the match analysis studies in the literature have revealed that physical performance can play a supporting role in successful technical performance (Hoppe, Slomka, Baumgart, Weber & Frelwald, 2015; Yang, Leicht, Lago & Gomez, 2018). Some studies have also reported that team success is related to technical performance (Andrzejewski et al., 2022; Lepschy, Wäsche & Woll, 2020). Looking at the research on physical performance, it has been reported that players in professional soccer leagues in Germany, Spain and England run an average distance of 10-11 km per match and approximately 5-7% of this distance is high-intensity running (Reynolds et al., 2021). In studies conducted by different authors and using different measurement techniques, it was found that the running distance in a soccer match was between 8.5-10.3 km in elite level women soccer players (Anderson, Randers, Heiner-Moller, Krusturup & Mohr, 2010; Mohr, Krusturup, Andersson, Kirkendal & Bangsbo, 2008). It has been shown that elite women soccer players perform an average of 1459 (1336-1529) activities with an intensity varying every 4 seconds per match in these competitions, and the number of high-intensity runs is 125 (72-159) with a duration varying every 2-3 seconds (Krusturup, Mohr, Ellingsgaard, & Bangsbo, 2005). According to Datson et al. (2017) and Doyle, Browne, and Horan (2020), players in women's soccer can cover a total of 9-12 km in a single match, including 1.5-2.5 km during high-intensity running. According to other studies in the literature, female players perform between 70 and 190 high-intensity runs ($>19.8 \text{ km.h}^{-1}$) during a match (McCormarck et al., 2014; Stepinski, Ceylan & Zwiwerko, 2020) and cover 210 to 520 m (Datson et al., 2015; Datson et al., 2017; Niessen, Hartmann & Marti, 2014). According to Bradley & Scott (2020) high-speed running distance (HSRD) was positively correlated with team success at the 2019 FIFA Women's World Cup.

Women's soccer is becoming increasingly popular (Pascual-Verdu & Carbonell-Martinez, 2018) and a competitive sport at the international level (Scanlan, Harms, Wilkie & Ma'ayah, 2020). Today, approximately 20 million women play soccer,

which is almost 10% of the total number of man and women soccer players worldwide (Can, Yaşar, Bayrakdaroğlu & Yıldız, 2019). This situation allows a wide variety of women soccers to train and compete in a professional environment. It has also increased the need for specific studies that can help improve the performance expectations and performance levels of women soccers (Martinez-Luganas, Niessen & Hartman, 2014). Therefore, match analysis research has also increased in recent years (Beare & Stone, 2019). Every four years FIFA organises the FIFA Women's World Cup, one of the biggest sporting events in the world (Kubayi & Larkin, 2020). In general, after such major organisations in soccer, the style of play, systems and players' movements of successful teams are certainly examined by experts (Başkaya & Şentürk, 2016). Although the number of studies involving women soccer players after major organisations is increasing day by day (Başkaya & Şentürk, 2016; Beare & Stone, 2019; Kubayi, 2022; Kubayi & Larkin, 2020; Maneiro, Losada, Casal & Arda, 2020; Pascual-Verdu & Carbonell-Martinez, 2018; Wang & Qin, 2020; Yousefian et al, 2021), there are limited number of studies in the literature evaluating the factors effecting performance in terms of both technical and running performance (Branquinho et al. 2024; Errekagorri, Echeazarra, Olaizola, & Castellano, 2023). This seems surprising, given that in a tournament environment the qualifying matches are of extraordinary importance for any possible scenario.

Studies have been conducted on male soccers (Başkaya & Karaca, 2023; Modric, Versic, Sekulic, & Liposek, 2019; Modric et al., 2021; Plakias et al., 2023b) and it is observed that there is a positive relationship between physical performance indicators (i.e. total running distance, running at different intensities) and offensive style of play (Modric et al., 2019, Modric et al., 2021; Plakias et al., 2023b). In men's soccer, the most consistent team throughout the season (team success) adopted a style of play with a high percentage of possession (Gollan, Ferrar, & Norton, 2018; Plakias et al., 2023a; Plakias et al., 2023b). However, in a study conducted by Branquinho et al. (2024) on women soccer players, the researchers observed that the superior performance of some variables, such as possession and progression, may prevent soccer players from covering longer distances. On the other hand, the researchers reported that teams that exchange more passes and break more defensive lines may be asked to run more and that there are certain key offensive indicators associated with match running performance. The results of the study by Errakagori et al. (2023) showed that there were some positive correlations between some variables of the tactical and physical dimension at the beginning and end of the match (periods 0-15, 60-75 and 75-90). The findings of the study suggest that combining the tactical and physical dimension in the interpretation of team performance will allow for a better understanding of player and team performance during the competition.

The FIFA Women's World Cup, where the world's best national teams compete, combines different styles of play, so important performance indicators can be different from other leagues and levels. Based on these points, it is considered important to investigate the physical, technical, and tactical performances of the winning and losing teams. In this direction, the aim of this study is to reveal the differences in the technical, physical and tactical performances of the countries participating in the 2023 FIFA Women's World Cup and their effect and relationship on the success of the tournament.

Methods

Participants

A total of 64 matches played by 32 countries participating in the 2023 FIFA Women's World Cup constitute the sample of the study. To examine the relationship between the physical, technical, and tactical performance parameters of the winning countries at the end of the tournament and the total number of goals, 51 matches were included in the analysis, except for the matches that ended in a draw in all stages.

Data Collection

The data of the study were collected by quoting the numerical analyses published at the end of each competition through the 2023 FIFA Women's World Cup database on the FIFA official website (Fédération Internationale de Football Association, 2023). This FIFA data is provided by TRACAB. TRACAB, which is approved by FIFA and has achieved the highest performance under the EPTS programme, obtains its data through a mobile system permanently installed in more than 300 stadiums worldwide (Tracab, 2023).

All data were recorded on the data collection form prepared by the researcher. It was then edited for statistical analysis and transferred to the SPSS 25.0 package programme. The data were analysed and evaluated by an expert analysis coach. In addition to the total number of goals scored, the number of draws with and without goals, all matches were analysed in 16 different categories (number of goals scored, goals conceded, ball possession (%), total passes, completed passes, pass completion (%), attempts at goal, attempts at goal on target, completed line breaks, defensive line breaks, receptions in the final third, second balls, number of offside, number of corners, total running distance and zone 4 (high intensity) running distance (19-23 km/h) were analysed separately for group and last 16 round matches. While determining the performance parameters, the parameters analysed in previous similar studies were taken into consideration (Başkaya & Karaca, 2023; Gürkan, Cihan, Yıldırım & Gümüşdağ, 2019; Mota, Thiengo, Gimenes & Bradley, 2016). In addition, the competition performances of the countries that won the matches in the tournament were associated with the total number of goals and points they collected in the tournament.

Statistical Analysis

Statistical analyses were performed using SPSS 25.0 (SPSS, Inc., Chicago, IL, USA). Whether the data were normally distributed was determined according to Kurtosis and Skewness values.

After it was determined that the data were normally distributed, Independent Samples T-Test was applied to reveal the difference between the countries that advanced to the next round and the countries that were eliminated. Cohen's d effect size (ES) was calculated at 95% confidence interval to define the magnitude of pairwise comparisons. Pearson Correlation Test was applied to determine the relationships between some of the performances of the countries and the total number of goals and total points. Magnitude-based reference intervals were used to describe the level of relationship between the data ($r > 0.9$ excellent; $0.7 < r < 0.89$ very high; $0.5 < r < 0.69$ high; $0.3 < r < 0.49$ moderate; $0.1 < r < 0.29$ small; $r < 0.09$ insignificant) (Hopkins, Marshall, Batterham & Hanin, 2009).

Ethical Statement

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Results

At the end of the 2023 FIFA Women's World Cup, a total of 64 matches were played, 13 matches (10 in the group stage, 2 in the last 16 round, 1 in the quarter-finals) ended in a draw and a total of 164 goals were scored (excluding penalty goals in matches that went to penalties). In 10 matches, no goal was scored after 90 minutes. Throughout the tournament, it was determined that the percentage of the ball that was not possessed by the countries and passed through a struggle in the centre of the field was 15.1 percent.

When the differences between the physical, technical, and tactical parameters of the countries that qualified for the last 16 among 32 countries at the end of the group matches and the countries that did not qualify for the last 16 were analysed, statistically significant differences were found between the number of goals scored, goals conceded, attempts at goal on target, receptions in the final third and number of corners in favour of the countries that qualified ($p < 0.05$). In the other variables, although no significant differences were found ($p > 0.05$), numerical results were obtained in favour of the countries that advanced to the next round (Table 1).

Table 1. Comparison of countries' performance at the end of group matches (n=16)

Variables	Teams	Mean ± SD	t	p	ES
Number of Goals Scored	A	1.90 ± 1.9	3.639	.003*	0.744
	B	.69 ± 1.22			
Goals Conceded	A	.69 ± 1.24	3.707	.005*	0.757
	B	1.92 ± 1.93			
Ball Possession (%)	A	45.34 ± 13.99	2.019	.601	0.000
	B	39.76 ± 13.07			
Total Passes	A	439.92 ± 167.54	1.857	.134	0.379
	B	383.46 ± 127.67			
Complete Passes	A	346.75 ± 176.79	1.852	.064	0.378
	B	287.96 ± 130.91			
Pass Completion (%)	A	75.51 ± 11.15	1.574	.498	0.321
	B	72.02 ± 10.60			
Attempts at Goal	A	15.13 ± 9.08	3.263	.054	0.666
	B	9.88 ± 6.45			
Attempts at Goal on Target	A	5.44 ± 3.77	4.122	.007*	0.842
	B	2.77 ± 2.41			
Completed Line Breaks	A	85.60 ± 30.48	2.719	.232	0.555
	B	69.98 ± 25.62			
Defensive Line Breaks	A	13.31 ± 20.78	.983	.588	0.201
	B	9.23 ± 19.89			
Receptions in the Final Third	A	119.50 ± 77.83	2.411	.009*	0.611
	B	87.48 ± 49.10			
Second Balls	A	99.17 ± 24.08	2.992	.790	0.492
	B	85.50 ± 20.53			
Number of Offside	A	1.77 ± 1.74	1.747	.082	0.355
	B	1.23 ± 1.25			
Number of Corners	A	5.77 ± 4.22	2.741	.041*	0.560
	B	3.77 ± 2.77			
Total Running Distance (km)	A	108.88 ± 5.94	.868	.868	0.176
	B	107.85 ± 5.74			
Zone 4 Distance (km)	A	4.84 ± .61	1.084	.589	0.228
	B	4.99 ± .69			

A: Advancing to the next round; B: Who did not advance to the next round, * $p < 0,05$

As a result of the analyses, at the end of the group matches; ball possession ($r = .367$; $p < 0.05$), total passes ($r = .408$; $p < 0.01$), complete passes ($r = .410$; $p < 0.01$); pass completion ($r = .397$; $p < 0.01$), attempts at goal ($r = .635$; $p < 0.01$), attempts at goal on target ($r = .744$; $p < 0.01$), completed line breaks ($r = .448$; $p < 0.01$), receptions in the final third ($r = .422$; $p < 0.01$) and second balls and total number of goals ($r = .392$; $p < 0.01$) at medium, high and very high levels. There was no relationship between defensive line breaks, number of offside, number of corners, total running distance and high intensity running distance and both the total number of goals and points scored

($p > 0.05$). In addition, there were moderately significant relationships between the number of corners ($r = .364$, $p < 0.05$) and Zone 4 distance ($r = .375$, $p < 0.01$) and the total points. (Table 2).

Table 2. The relationship between performances of the countries existing the group at the end of the group matches and the number of goals scored and points collected

Parameters	Number of Total Goals		Total Points	
	r	p	r	p
Ball Possession (%)	.367*	.010	.199	.176
Total Passes	.408**	.004	.168	.255
Complete Passes	.410**	.004	.172	.242
Pass Completion (%)	.397**	.005	.164	.264
Attempts at Goal	.635**	.000	.237	.104
Attempts at Goal on Target	.744**	.000	.221	.131
Completed Line Breaks	.448**	.001	.114	.440
Defensive Line Breaks	-.045	.762	-.176	.230
Receptions in the Final Third	.422**	.003	.277	.057
Second Balls	.392**	.006	-.110	.456
Number of Offside	.143	.331	.267	.067
Number of Corner	.284	.050	.364*	.011
Total Running Distance	-.138	.349	.139	.347
Zone 4 Distance	.065	.659	.375**	.009

* $p < 0,05$, ** $p < 0,01$

When the difference between the the physical, technical, and tactical performance parameters of the teams that made it to the quarterfinals and the teams that did not make it to the quarterfinals was examined, although no significant difference was found in any variable ($p > 0.05$), numerical results were obtained in favour of the countries that made it to the upper round (Table 3).

When the difference between the physical, technical, and tactical performance parameters of the teams that made it to the semi-finals and the teams that did not make it to the semi-finals was analysed, a significant difference was found between the number of offsides, while no significant difference was found in any other variable ($p > 0.05$) (Table 4).

Table 3. Comparison of the performance of the countries that made it to the last 8 and those that did not (n=8)

Variables	Teams	Mean ± SD	t	p	ES
Ball Possession (%)	A	49.44 ± 12.41	2.809	.130	0.140
	B	34.48 ± 8.54			
Total Passes	A	537.75 ± 143.44	2.890	.085	0.144
	B	366.50 ± 86.68			
Complete Passes	A	446.75 ± 150.45	2.944	.069	0.147
	B	264.50 ± 89.55			
Pass Completion (%)	A	81.46 ± 7.08	2.612	.778	0.219
	B	70.51 ± 9.51			
Attempts at Goal	A	13.13 ± 5.35	1.667	.567	0.083
	B	8.50 ± 5.73			
Attempts at Goal on Target	A	4.38 ± 2.72	1.532	.655	0.077
	B	2.50 ± 2.13			
Completed Line Breaks	A	93.25 ± 20.78	2.637	.965	0.132
	B	66.63 ± 19.58			
Defensive Line Breaks	A	8.13 ± 3.68	1.647	.975	0.082
	B	5.13 ± 3.60			
Receptions in the Final Third	A	130.25 ± 53.95	2.320	.423	0.116
	B	76.75 ± 36.67			
Second Balls	A	89.75 ± 8.51	.298	.087	0.015
	B	88.13 ± 12.85			
Number of Offside	A	1.88 ± .99	2.183	.286	0.109
	B	.88 ± .83			
Number of Corner	A	5.25 ± 3.15	2.055	.341	0.103
	B	2.63 ± 1.76			
Total Running Distance (km)	A	114.83 ± 15.30	.115	.984	0.006
	B	113.98 ± 14.29			
Zone 4 Distance (km)	A	5.10 ± 1.01	.082	.677	0.004
	B	5.06 ± .79			

A: Advancing to the next round; B: Who did not advance to the next round, *p<0,05, **p<0,01

Table 4. Comparison of the performances of the semi-finalist and non-qualifying countries (n=4)

Variables	Teams	Mean ± SD	t	p	ES
Ball Possession (%)	A	46.93 ± 4.94	2.254	.501	0.159
	B	38.38 ± 5.75			
Total Passes	A	546.25 ± 88.27	2.228	.737	0.158
	B	417.75 ± 74.22			
Complete Passes	A	437.00 ± 80.98	2.100	.844	0.149
	B	318.50 ± 78.57			
Pass Completion (%)	A	79.83 ± 5.65	.940	.848	0.066
	B	75.73 ± 6.65			
Attempts at Goal	A	16.00 ± 7.25	.397	.638	0.028
	B	14.25 ± 4.99			
Attempts at Goal on Target	A	5.75 ± 2.50	1.599	.379	0.113
	B	3.50 ± 1.29			

Table 4. continue

Variables	Teams	Mean ± SD	t	p	ES
Completed Line Breaks	A	73.50 ± 39.61	-909	.177	0.064
	B	92.75 ± 14.97			
Defensive Line Breaks	A	11.25 ± 4.11	.902	.327	0.064
	B	9.00 ± 2.82			
Receptions in the Final Third	A	149.75 ± 53.92	1.014	.276	0.072
	B	119.75 ± 24.41			
Second Balls	A	105.75 ± 33.27	.197	.544	0.014
	B	101.75 ± 23.38			
Number of Offside	A	.75 ± .50	1.378	.040*	0.974
	B	4.00 ± 4.69			
Number of Corner	A	6.00 ± 2.44	.289	.319	0.020
	B	5.25 ± 4.57			
Total Running Distance (km)	A	127.18 ± 19.56	.244	.932	0.017
	B	123.83 ± 19.34			
Zone 4 Distance (km)	A	5.90 ± 1.33	.516	.441	0.036
	B	5.48 ± .96			

A: Advancing to the next round; B: Who did not advance to the next round, *p<0,05

Table 5. The relationship between performances of the winning countries at the end of the tournament and the number of goals scored

Parameters	Number of Total Goals	
	r	p
Ball Possession (%)	.320*	.022
Total Passes	.450**	.001
Complete Passes	.457**	.001
Pass Completion (%)	.350*	.012
Attempts at Goal	.532**	.000
Attempts at Goal on Target	.630**	.000
Completed Line Breaks	.446**	.001
Defensive Line Breaks	.113	.431
Receptions in the Final Third	.392*	.004
Second Balls	.218	.124
Number of Offside	.229	.106
Number of Corner	.206	.147
Total Running Distance	-.066	.644
Zone 4 Distance	-.072	.616

*p<0,05, **p<0,01

As a result of the analyses, the countries that won the competitions throughout the tournament; percentage of possession (r=0.320; p<0.05), total number of passes (r=0.450; p<0.01), number of passes with accuracy (r=0.457; p<0.01) and percentage (r=0.350; p<0.05), attempts at goal (r=0.532; p<0.01), attempts at goal (r=0.630; p<0.01), attempts at goal on target (r=0.630; p<0.01), completed line breaks (r=0.446; p<0.01) and receptions in the final third and total number of goals (r=0.392; p<0.05) (Table 5).

Discussion

The results of the present study showed that: 1) a total of 164 goals were scored at the end of 64 matches played; 2) Significant differences were found in the number of goals scored, goals conceded, attempts on goal at target, receptions in the final third, number of corners between the countries that qualified for the last 16 and those that did not (Table 1); 3) At the end of the group competitions of the countries; ball possession, total passes, complete passes, pass completion, attempts at goal, attempts at goal on target, completed line breaks, receptions in the final third and second balls and total number of goals at medium, high and very high levels. In addition, there were moderately significant relationships between the number of corners and Zone 4 distance and the total points. (Table 2). 4) No significant differences were found between the countries that made it to the quarter-finals and those that did not (Table 3); 5) There was a significant difference in the parameter of the number of offsides between the countries that made it to the semi-finals and those that did not (Table 4); 6) Moderate and high level; positive relationships were found between possession percentage, total and accurate number and percentage of passes, attempts at goal, attempts at goal on target, attempts at goal on target, completed line breaks and receptions in the final third and total number of goals (Table 5).

It is often suggested that high levels of running performance are important for success in soccer teams. Previous research on soccer suggests that high speed running distance is also an important performance indicator (Rampinini, Coutts, Castagna, Sassi & Impellizzeri, 2007; Schauburger, Groll & Tutz, 2017). According to Arı and Apaydın (2022), short-term, intermittent and high intensity activities closely effect the match performance in soccer and the number of goals scored and conceded by the teams. These findings contradict with the results obtained in our study. In our study, it was determined that high intensity running distance had an effect on the total score only at the end of the group competitions, not on the goals scored or conceded. However, there are also studies in the literature that support the results of our study in terms of running performance (Başkaya & Karaca, 2023; Bilgin & Müniroğlu, 2022; Gürkan et al., 2019; Lepschy et al., 2020; Lepschy, Woll & Wäsche, 2021; Modric et al., 2022; Polat & Gürkan, 2020; Rampinini, Impellizzeri, Castagna, Coutts & Wisloff, 2009; Rumpf, Silva, Hertzog, Faroog & George, 2017; Yang et al., 2018). When the matches won in all stages are considered as a whole, it is determined that there is no relationship between any running distance and the total number of goals scored, and there is no difference between the winning and losing countries in both group and last 16 rounds. In a similar study, Başkaya and Karaca (2023) did not find significant differences between the running distance parameters of the countries that exited the groups, advanced to the quarter and semi-finals and failed in the 2022 FIFA World Cup. Although the researchers found a relationship between total running distance and the number of goals scored

in their evaluation of all competitions won, they reported that this relationship was at a moderate level and they did not find such a relationship at the end of the group stages. In another study, Bilgin and Müniroğlu (2022) reported that total and high intensity running distances did not create any difference between winning and losing teams.

A similar result was found in a study conducted to compare some performance parameters of the winning and losing countries in the 2018 World Cup (Gürkan et al., 2019). Another similar result was presented by Lepschy et al. (2021), who concluded that running distance had no effect on national success in the World Cup matches in 2014 and 2018. In a study of teams in the UEFA Champions League, researchers found similar running performance values and insignificant to small correlations between running performances and total group scores, regardless of whether the teams moved from the group stage to the knockout stage. These findings suggest that players' running distances are only weakly related to their team's success in the Champions League group stage, pointing to the insignificant effect of running performance on success in elite level soccer (Modric et al., 2022). Rumpf et al. (2017), in their study in which they tried to reveal both technical and physical performance indicators between the winning and losing teams during the FIFA World Cup tournament, stated that at this level, the physical performance of countries is not a factor that distinguishes between winners and losers, but that technical performances have a greater impact on the outcome of the game compared to physical parameters, as technical parameters are significantly different between two teams within a game. In our study, although there were no significant differences, it was revealed that the countries that did not make it to the next round had numerically more high intensity running distance than the countries that made it to the next round. This is in parallel with the results of the present study.

Consequently, studies in the literature argue that technical/tactical and psychological skills will ultimately discriminate between more successful and less successful teams (Di Salvo, Gregson, Atkinson, Tordoff & Drust, 2009; Rampinini et al., 2009; Rumpf et al., 2017). According to Bradley et al. (2011), differences in tactical instructions may also be affected by the physical demands placed on soccer players in possession and non-possession situations. Managers, coaches and players typically refer to "leaving it to the ball" to express that the team that does not have possession has to physically work harder to win the ball back. According to Mota et al. (2016), since playing against higher quality opponents is associated with lower ball possession (Lago, 2009), the subjective perception of "leaving it to the ball" will result in greater high-speed running and total distance to regain possession. Some studies have shown that soccer players run at a higher speed and for a greater total distance when playing against higher quality opponents (Di Salvo et al.,

2009; Rampinini et al., 2007). In our study, the result that there was no difference in total running and high-speed running distance between the teams that made it to the next round and those that did not, and therefore it was the technical/tactical parameters (such as number of goals, goal attempts, receptions in the final third) that made the difference, is in line with the findings of the studies above.

Although physical performances are not related to success, they effect technical competence (Rampinini et al., 2008) and therefore should not be ignored as contributing factors to overall performance. From this point of view, not only physical performances but also technical/tactical parameters were considered in our study. In our study, the total number of passes did not differ between winning and losing teams (Rumpf et al., 2017), as observed in the 2002 World Cup (Scoulding, James & Taylor, 2004), which is partially in line with the existing literature. However, different studies reported that this parameter was associated with successful teams in the 2010 World Cup (Clemente, 2012). While passes are used for ball possession, the variable itself has been reported as a performance indicator for success in different leagues and at international level (Bostancı et al., 2018; Bradley, Lago-Penas, Rey & Gomez, 2013; Gözübüyük & Karac, 2021; Liu, Miguel, Bruno & Jaime, 2016; Parziale & Yates, 2013). In a study conducted in 2014 FIFA World Cup to examine the possession and passing success percentages of the successful teams, it was reported that the possession percentages of the successful teams varied between 50.32% and 56.71% and the highest rate belonged to the national team of Germany, the champion of the tournament. The study also revealed that the teams ranked in the top four in the World Cup had a high rate of possession (Göral, 2015). On the other hand, in our study, although there were no significant differences in the total number of passes, number of accurate passes and percentage, it was determined that the countries that came out of the groups were numerically superior. It is thought that the lack of a significant difference in these parameters may be due to the fact that the countries competing in the competitions have almost the same qualities and characteristics at this level and stage. In teams consisting of players with high technical skills, more accurate passes can directly affect the success of the team. However, although success in today's soccer depends on offensive play and possession of the ball, these basic factors may not always be valid for achieving success. Lepschy et al. (2021) also reported that ball possession did not have any effect on success. A similar result is seen in the study conducted by Gürkan et al. (2019) on the 2018 World Cup. Bilgin and Müniroğlu (2022) also reported that the total and successful number of passes and the percentage of ball possession did not change according to the winning and losing teams. The findings in this study, together with the results of our study, support the assumption that possession of the ball loses its significant effect when the results of the competition are controlled for other influential variables (Collet, 2013). Although possession is one of the most frequently studied performance indicators in soccer,

it is thought that its relationship with team performance should be further clarified. Because, although possession of the ball does not guarantee winning, it means determining the tempo and rhythm of the match and most importantly, it forces the opponent to run too much (Göral, 2015).

Conclusion and Recommendations

As a result, it can be said that in today's soccer, countries perform almost equally in terms of physical performance in terms of going to the result and establishing superiority, but countries that develop their offensive side and make positive use of the opportunities they have, make a difference, and reach the result. Game with the ball, which is one of the most fundamental elements of soccer, can be ignored in match performance analysis, especially when using the GPS system. It can be suggested that researchers who will conduct research on match and performance analysis should analyze the game with and without the ball separately in physical performance evaluation.

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Conflict of Interest

The authors have no conflicts of interest to declare.

Author Contributions

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