

# Comparing physical, technical and tactical performances in the World Cup Qatar 2022

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## ABSTRACT

The main objective of this study was to compare the physical, technical, and tactical performances of the 32 teams that participated in the FIFA World Cup Qatar 2022™ concerning the confederation to which they belong and the FIFA ranking. Key statistics from the 64 matches played during the FIFA World Cup Qatar 2022™ were analysed. The data from these matches were encoded and calculated by a multi-camera optical tracking system (TRACAB Gen5, ChyronHego). Significant differences were identified between Rank 1-15th vs. Rank 16-35th and Rank 1-15th vs. Rank 36-61st for possession, total attempts at goal, total attempts on target, total passes, total complete passes, passes completion possession, completed line breaks, defensive line breaks, receptions in the final third, and ball progressions. However, defensive line breaks were different only between Rank 1-15th vs. Rank 36-61st, and ball progressions was only different between Rank 1-15th vs. Rank 16-35th. Africa and Europe national confederation showed significant differences (all  $p < .05$ ) for possession, total attempts on target, total passes, total complete passes, passes completion, completed line breaks, and receptions in the final third, except for total attempts on target, whose differences are between Asian and South American confederation ( $p < .05$ ). When considering the FIFA ranking and the confederations, there are significant differences key performance indicator of the teams.

**Keywords:** Performance analysis, Soccer, National teams, Key statistics, Match running, Analysis.

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## INTRODUCTION

The FIFA World Cup (WC) is the most popular sporting event in the world (Chadwick et al., 2022). This competition is organized by FIFA and takes place every four years in a different part of the globe (Andersson et al., 2021), where the best teams from each continent try to win the title of world champion. Nowadays, there are six football confederations (Csató, 2023), each with a few specific places for participation. The South American Football Confederation (CONMEBOL) has three to four teams, 13 teams come from the Union of European Football Associations (UEFA), four or five from the Asian Football Confederation (AFC), five teams from the African Football Confederation (CAF), three or four teams from the Football Confederation of North, Central America and the Caribbean (CONCACAF), and zero or one from the Football Confederation of Oceania (OFC), in addition to the host country that has a direct entry (Durán et al., 2017; Kessouri, 2023; Kubayi & Toriola, 2020).

For the first time in history, the FIFA Qatar 2022™ (2022-WC) took place in the middle of the competitive season and there is a growing curiosity to clarify the impact that these changes had on the performance of the teams (Kessouri, 2023). For this reason, it seems essential to carefully analyse variables associated with the physical, technical, and tactical components that occurred during the competition. In recent years, one of the most used performance determinants in soccer has been physical variables (Branquinho et al., 2021; Durán et al., 2017; Lago-Peñas, 2012; Pino-Ortega et al., 2021). However, numerous investigations have reported on technical performance (Arslan et al., 2020; Modric et al., 2019), tactical behaviour (Goes et al., 2021; Musa et al., 2019), and the interdependence between them (Aquino et al., 2016; Filetti et al., 2017). Previous evidence reported that physical performance standards seemed to vary between athletes from different continents (Alves et al., 2019; Tuo et al., 2019), and these issues may be particularly important when comparing performance across different national teams. Despite the constant growth of football worldwide, and the evolution of infrastructures and constant technological advances, there are still differences between clubs from different continents that can influence performance in the national team context (Goslin & Mosola, 2020), mainly in confederations with less competitive championships (Gasparetto & Barajas, 2020; Razmjoooy et al., 2016). The importance of ball possession and its influence on the result of matches is a topic of current discussion (da Mota et al., 2016; Kubayi & Toriola, 2019; Maneiro et al., 2020). Previous investigations reported that teams that achieved greater ball possession times achieved better rankings in championships (Alves et al., 2019; Lago-Peñas & Dellal, 2010). Regarding the technical component, a previous investigation reported that there seemed to be a positive relationship between the number of blocks, pass accuracy, finishing ability, counterattacks, and the probability of winning (Fernandez-Navarro et al., 2019; Lepschy et al., 2018).

Thus, based on the undeniable importance of these variables on performance, it seems important to verify the existing differences regarding the physical, technical, and tactical performances of the teams that participated in the 2022-WC as previously identified (Kubayi & Toriola, 2020). Changes in the competition schedule may negatively or positively affect the performances of national teams from different confederations. In addition, it seems interesting to verify whether the performances obtained by the teams are related to the FIFA Ranking since this directly influences the draw for the group stage of the competition.

Thus, the main objective of this study was to compare the physical, technical, and tactical performances of the 32 teams that participated in the 2022-WC concerning the confederation to which they belong and the FIFA ranking.

## MATERIAL AND METHODS

### Participants

Key statistics from the 64 matches played during the 2022-WC were analysed. The data from these matches were encoded and calculated by a tracking system (multi-camera optical tracking system: TRACAB Gen5, ChyronHego), available free of charge at the FIFA website (<https://www.fifatrainingcentre.com/en/game/tournaments/fifa-womens-world-cup/2023/match-report-hub/post-match-summary-reports.php>). The validity and accuracy of data collection by TRACAB Gen5 were previews provided (Linke et al., 2020).

### Procedures

To analyse the game's variables, the teams were divided according to the FIFA Ranking in which they were at the beginning of the competition (October 2022) and the confederation to which they belonged. Thus, the teams were grouped as follows: a) UEFA (13 teams); b) CONMEBOL (4 teams); c) CONCACAF (4 teams); d) CAF (4 teams); e) AFC + Australia (6 teams). In total, 18 variables were analysed that were classified as key indicators (i.e., physical, technical, and tactical). As the 32 teams played 3 to 7 matches (a total of 128 games), we calculated the average of the 18 variables for each team, thus producing 32 data sets. Eight data from matches that had extra time (i.e., 120 minutes) were excluded. Table 1 shows the variables that were analysed and how they were calculated.

### Statistical analysis

For descriptive statistics, the Kolmogorov–Smirnov and Levene's tests were used to test the normality and homogeneity, where a normal distribution was observed. Data are presented as the mean  $\pm$  SD. National teams were encoded according to FIFA conference (i.e., AFC, CAF, UEFA, CONMEBOL, and CONCACAF) and ranking (i.e., 1-15<sup>th</sup> vs. 15-35<sup>th</sup> vs. 36-61<sup>st</sup>). To compare groups, we use one-way analysis of variance (ANOVA) and when a significant difference occurred, Tukey post-hoc tests were used to identify localized effects in mean differences in key indicators performance (KPI) for each condition. The effect size index (eta square:  $\eta^2$ ) was computed and interpreted as: (i) without effect if  $0 \geq \eta^2 \leq 0.04$ ; (ii) minimum if  $0.04 > \eta^2 \leq 0.25$ ; (iii) moderate if  $0.25 > \eta^2 \leq 0.64$ ; and (iv) strong if  $\eta^2 > 0.64$  (Ferguson, 2009; Hopkins et al., 2009). Statistical significance was set at  $p < .05$ . All statistical analyses were conducted using IBM SPSS Statistics for Windows (Version 27.0., IBM Corp, Armonk, NY, USA). ES calculations were performed with G\*Power (Version 3.1.5.1 Institut für Experimentelle Psychologie, Düsseldorf, Germany). Data visualization was produced using GraphPad Prism (GraphPad Software, Inc., San Diego, CA, USA).

## RESULTS

Table 1 presents FIFA ranking group mean differences for each key performance indicator (KPI). Significant differences were found between Rank 1-15<sup>th</sup> vs. Rank 15-35<sup>th</sup> and Rank 1-15<sup>th</sup> vs. Rank 36-61<sup>st</sup> for possession, total attempts at goal, total attempts on target, total passes, total complete passes, pass completion, completed line breaks, defensive line breaks, receptions in the final third, and ball progressions (all  $p < .05$ ), except in defensive line breaks, ball progressions, and total defensive pressures applied (see Table 1 and Figure 1).

Table 2 presents the mean differences between FIFA confederations for each KPI. Significant differences between confederations CAF and UEFA national teams showed significant differences were found for possession, total attempts on target, total passes, total complete passes, passes completion, completed line

Table 1. Mean differences in key performance indicator (KPI) for each FIFA ranking group.

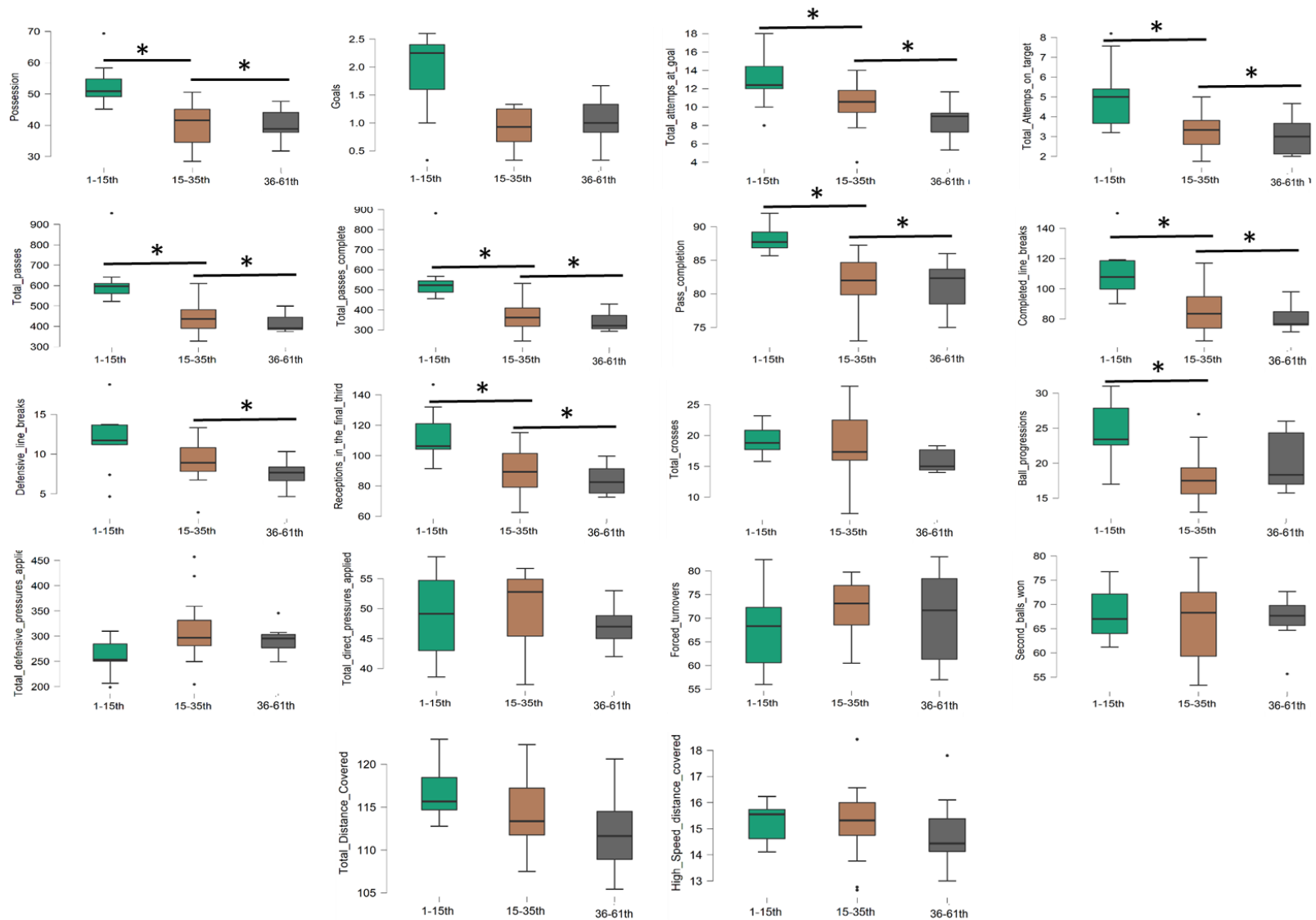
Variables	FIFA Ranking			ANOVA		Post-Hoc	
	Rank 1-15 <sup>th</sup> (n = 14)	Rank 16-35 <sup>th</sup> (n = 11)	Rank 36-61 <sup>st</sup> (n = 7)	F	p	$\eta^2$	Tukey
Possession (%)	49.86 ± 7.32	38.44 ± 7.38	40.29 ± 5.60	9.31	< .001	0.39	a,b
Goals (N)	1.54 ± 0.81	0.95 ± 0.38	1.05 ± 0.45	3.17	.057	0.18	-
Total attempts at goal (N)	12.57 ± 2.89	9.92 ± 2.47	8.46 ± 2.12	6.66	.004	0.35	a,b
Total attempts on target (N)	4.69 ± 1.55	3.02 ± 0.80	3.04 ± 1.04	7.22	.003	0.33	a,b
Total passes for (N)	575.85 ± 128.14	416.13 ± 67.25	417.91 ± 46.26	10.64	< .001	0.42	a,b
Total complete passes (N)	504.39 ± 128.04	341.99 ± 68.01	343.12 ± 49.77	10.92	< .001	0.43	a,b
Passes completion (%)	86.71 ± 2.71	81.15 ± 3.89	81.10 ± 4.00	10.39	< .001	0.42	a,b
Completed line breaks (N)	104.60 ± 18.17	83.00 ± 15.93	81.12 ± 8.97	7.82	.002	0.35	a,b
Defensive line breaks (N)	11.20 ± 3.36	8.68 ± 2.91	7.54 ± 1.83	4.31	.023	0.23	b
Receptions in the final third (N)	107.54 ± 16.91	85.51 ± 14.13	84.02 ± 10.86	8.66	.001	0.37	a,b
Total crosses (N)	19.62 ± 3.69	17.46 ± 5.10	15.93 ± 1.88	2.21	.128	0.13	-
Ball progressions	22.61 ± 4.77	17.49 ± 4.18	20.39 ± 4.43	4.00	.029	0.22	a
Total defensive pressures (N) applied (N)	269.39 ± 4.43	320.12 ± 71.82	293.06 ± 30.61	3.16	.057	0.18	-
Total direct pressures applied (N)	46.76 ± 6.43	49.88 ± 6.92	47.10 ± 3.59	0.54	.591	0.04	-
Forced turnovers (N)	69.95 ± 7.78	71.99 ± 5.77	70.16 ± 10.30	0.23	.793	0.02	-
Second balls won (N)	68.34 ± 5.43	66.39 ± 9.08	66.70 ± 5.51	0.28	.760	0.02	-
Total distance covered (Km)	115.65 ± 4.14	115.15 ± 4.09	112.08 ± 5.13	1.69	.206	0.10	-
High speed distance covered (km)	15.25 ± 1.01	15.29 ± 1.48	14.90 ± 1.58	0.22	.801	0.02	-

Letters in Turkey post-hoc: a, differences between Rank 1-15th vs. Rank 15-35th; b, differences between Rank 1-15th vs. Rank 35-61st.

Table 2. Mean differences in key performance indicator (KPI) for each between FIFA Confederations.

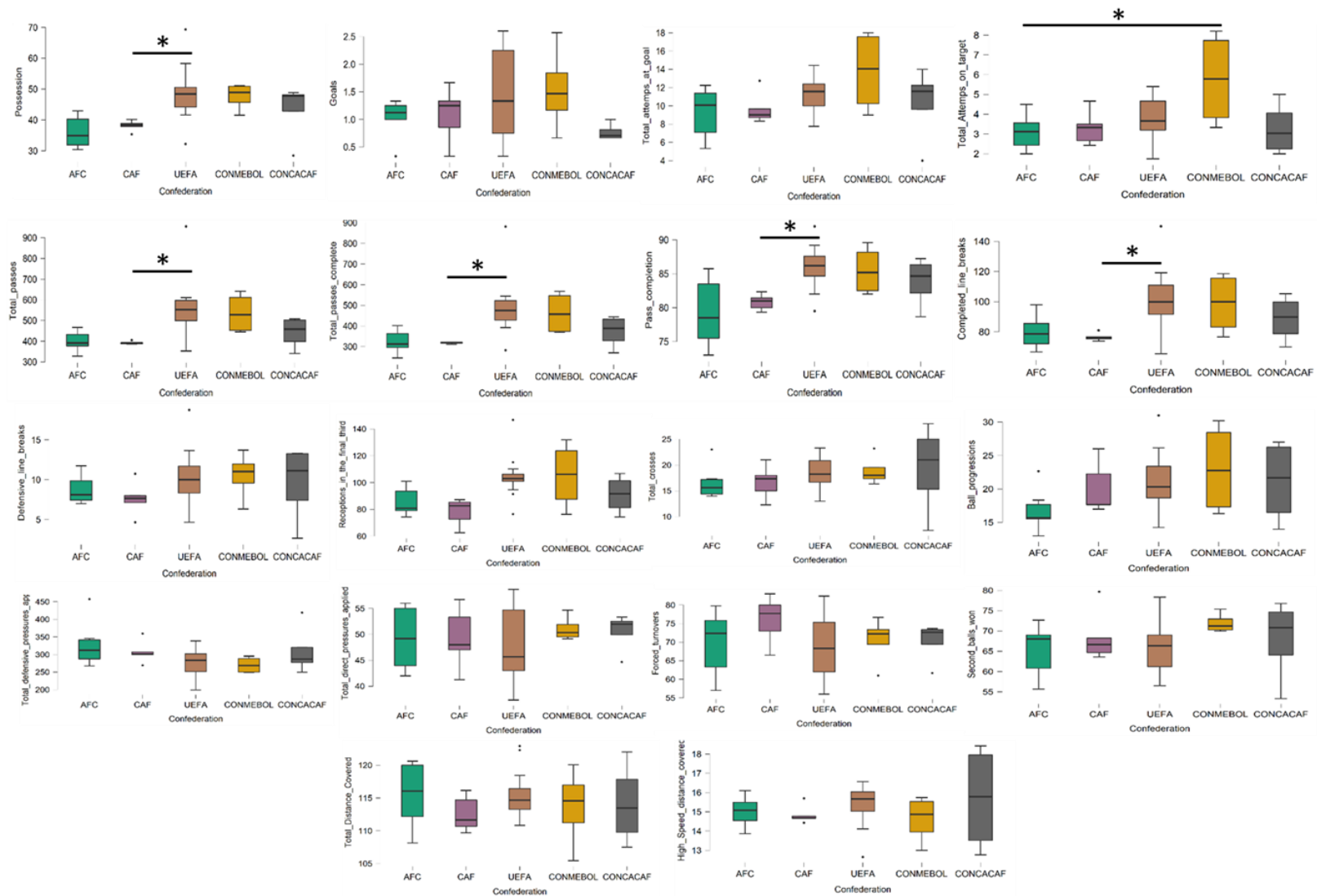
Variables	FIFA Confederations					ANOVA			Post-Hoc
	AFC (n = 5)	CAF (n = 5)	UEFA (n = 13)	CONMEBOL (n = 4)	CONCACAF (n = 4)	F	p	$\eta^2$	Tukey
Possession (%)	36.02 ± 5.31	38.14 ± 1.77	48.67 ± 8.89	47.64 ± 4.47	43.23 ± 9.85	4.14	.010	0.15	b
Goals (N)	1.03 ± 0.37	1.09 ± 0.51	1.42 ± 0.81	1.54 ± 0.79	1.77 ± 0.16	1.20	.333	0.20	-
Total attempts at goal (N)	9.28 ± 2.86	9.69 ± 1.78	11.07 ± 2.15	13.77 ± 4.61	10.29 ± 4.35	1.69	.182	0.31	-
Total attempts on target (N)	3.11 ± 0.92	3.32 ± 0.88	3.74 ± 1.08	5.78 ± 2.46	3.27 ± 1.38	3.09	.032	0.38	c
Total passes for (N)	399.19 ± 50.04	392.47 ± 7.49	561.34 ± 137.99	535.96 ± 100.47	441.48 ± 78.60	4.20	.009	0.38	b
Total complete passes (N)	323.69 ± 57.30	317.93 ± 4.08	488.49 ± 137.90	462.78 ± 105.30	372.98 ± 80.56	4.16	.009	0.41	b
Passes completion (%)	79.23 ± 5.18	80.82 ± 1.18	85.96 ± 3.21	85.50 ± 3.74	83.81 ± 3.80	4.64	.006	0.33	b
Completed line breaks (N)	79.97 ± 11.50	76.57 ± 2.68	102.50 ± 19.96	98.79 ± 20.91	88.73 ± 15.91	3.33	.024	0.10	b
Defensive line breaks (N)	8.78 ± 1.88	7.65 ± 2.17	10.29 ± 3.57	10.53 ± 3.08	9.56 ± 5.02	0.75	.567	0.35	-
Receptions in the final third (N)	85.57 ± 10.91	78.10 ± 10.34	104.34 ± 15.86	105.17 ± 25.78	91.10 ± 14.77	3.60	.018	0.06	b
Total crosses (N)	16.65 ± 3.40	16.72 ± 3.28	18.59 ± 3.21	18.90 ± 2.99	19.33 ± 8.99	0.46	.763	0.15	-
Ball progressions	16.82 ± 3.33	20.12 ± 3.90	21.06 ± 4.56	23.01 ± 7.03	21.08 ± 6.41	1.19	.339	0.22	-
Total defensive pressures (N) applied (N)	329.96 ± 68.67	307.34 ± 32.65	269.30 ± 44.04	270.45 ± 23.88	310.71 ± 74.32	1.92	.135	0.03	-
Total direct pressures applied (N)	49.25 ± 6.35	49.26 ± 5.98	48.21 ± 7.58	51.12 ± 2.49	50.48 ± 3.94	0.21	.932	0.10	-
Forced turnovers (N)	69.78 ± 9.07	76.04 ± 6.46	69.28 ± 8.16	70.54 ± 6.69	70.15 ± 5.70	0.74	.576	0.10	-
Second balls won (N)	65.36 ± 6.69	68.56 ± 6.46	66.11 ± 6.71	71.97 ± 2.47	67.94 ± 10.45	0.73	.580	0.07	-
Total distance covered (Km)	115.52 ± 5.28	112.57 ± 2.74	115.63 ± 3.64	113.66 ± 6.18	114.12 ± 6.45	0.52	.725	0.07	-
High speed distance covered (km)	15.01 ± 0.81	14.85 ± 0.49	15.42 ± 1.10	14.62 ± 1.25	15.69 ± 2.84	0.53	.715	0.15	-

Letters in Turkey post-hoc: b, significant differences between CAF and UEFA; c differences between AFC and CONMEBOL. Significant differences are verified as: (a) Asia/AFC vs Africa/CAF; (b) Asia/AFC vs Europe/UEFA; (c) Asia/AFC vs South America/CONMEBOL; (d) Asia/AFC vs North and Central America/CONCACAF; (e) Africa/CAF vs Europe/UEFA; (f) Africa/CAF vs South America/Conmebol; (g) Africa/CAF vs North and Central America/CONCACAF; (h) Europe/UEFA vs South America/Conmebol; (i) Europe/UEFA vs North and Central America/CONCACAF; (j) North and Central America/CONCACAF vs South America/Conmebol. Abbreviations: AFC – Asian Football Confederation; CAF – Confédération Africaine de Football; UEFA – Union Européenne de Football Association; CONMEBOL – Confederación Sudamericana de Fútbol; CONCACAF – Confederation of North, Central American and Caribbean Association Football; F – F statistics; p – p value;  $\eta^2$  – eta squared.



Note. \* Denote statistical difference at  $p < .05$ . Abbreviations: FIFA – Fédération Internationale Football Association.

Figure 1. Key performance indicator (KPI) for each FIFA ranking group.



Note. \* Denote statistical difference at  $p < .05$ . Abbreviations: AFC –Asian Football Confederation; CAF – African Football Confederation; UEFA – Union of European Football Associations; CONMEBOL – The Organization for Football in South America; CONCACAF – Confederation of North, Central American and Caribbean Association Football.

Figure 2. Key performance indicator (KPI) according to confederations.

breaks, and receptions in the final third, except for total attempts on target, whose differences are between AFC and CONMEBOL teams (see Table 2 and Figure 2).

Table 2 presents the mean differences between FIFA confederations for each KPI. Significant differences between confederations were found for possession, total attempts on target, total passes, total complete passes, passes completion, completed line breaks, and receptions in the final third. According to post hoc analysis, CAF and UEFA national teams showed significant differences on all mentioned variables, except for total attempts on target, whose differences are between AFC and CONMEBOL teams (see Table 2 and Figure 2).

## DISCUSSION

The aim of this study was to compare the physical, technical, and tactical performances of the 32 teams that participated in the 2022-WC concerning the confederation to which they belong and the FIFA ranking. This study confirmed differences between national teams from Rank 1-15<sup>th</sup> vs. Rank 15-35<sup>th</sup> and Rank 1-15<sup>th</sup> vs. Rank 36-61<sup>st</sup> for possession, total attempts at goal, total attempts on target, total passes, total complete passes, pass completion, completed line breaks, defensive line breaks, receptions in the final third, and ball progressions (all  $p < .05$ ), except in defensive line breaks, ball progressions, and total defensive pressures applied. Relating FIFA confederations, significant differences were found between CAF and UEFA national teams for possession, total attempts on target, total passes, total complete passes, pass completion, completed line, and receptions in the final third.

The FIFA ranking and confederations are two separate international football factors that are not directly related to each other. Thus, the present study aimed to understand how each factor can affect the KPI during the 2022-WC (Cea et al., 2020). The FIFA Ranking determines the relative strength and performance of national teams, being calculated based on a variety of factors, including match results, the importance of matches, and the strength of opponents (Kubayi, 2020). The FIFA ranking provides an indication of a team's performance and standing in international football but does not have a direct impact on the WC itself. It is more of a reference point to assess a team's strength and potential (Kessouri, 2023). This study confirmed the effect of FIFA Ranking in all KPI's variables, except in defensive line breaks, ball progressions, and total defensive pressures applied.

However, once the WC begins, the FIFA ranking does not directly affect a team's performance or KPIs. The teams compete against each other on an equal footing, and their performance in the tournament determines their success (Kubayi, 2020). Tuo et al. (Tuo et al., 2019) showed significant differences in the match running performance between national players from UEFA and CONMEBOL. Also, Tuo et al. (Tuo et al., 2019) reported that football players from AFC, CAF, and CONCACAF conferences covered less total distance, spent less playing time, and covered less distance in jogging and low-speed running. In contrast, they spent more time walking than players from UEFA and CONMEBOL. Our study only reported significant differences between UEFA and CAF players in 2022-WC, corroborating with study from 2018 which show differences in offensive variables (Kubayi & Toriola, 2020). On the other hand, in 2018 was also reported a similarity in top speed achieved, number of sprints made, and time spent and distance covered in the moderate- and high-speed running (HSR) intensity zones by players from all confederations (Tuo et al., 2019). According to Tuo's study, the HSR distance covered by CONCACAF players was less than that by CAF players. In our study, the match running performance does not present significant differences, unlike the technical performance variables where there are differences between CAF and UEFA national players (i.e., possession, total



passes, total complete passes, passes completion, completed line breaks, and receptions in the final third). Only total passes showed significant differences between Asian and South American players.

As well, the FIFA ranking provides an overall assessment of a team's performance and standing in international football, while the WC tournament structure involves group stages and knockout rounds. These factors, along with a team's preparation, squad quality, tactical approach, and individual performances, play significant roles in determining a team's performance and KPIs during the 2022-WC. In fact, that this ranking is updated monthly makes it more unstable, and there is no consensus on its application in practical terms. Instead, the tournament is structured with group stages, followed by knockout rounds leading to the final, something that can influence during the group phase and especially in the knockout phase. Previous, Cea et al. (2020) analysed the FIFA ranking impact on WC finals, reporting a series of small adjustments to that technique, using a prediction model calibrated to generate a reference ranking. A qualitative and statistical examination of the FIFA ranking informs these recommended changes. Our research confirmed differences between national teams from Rank 1-15<sup>th</sup> vs. Rank 16-35<sup>th</sup> and Rank 1-15<sup>th</sup> vs. Rank 36-61<sup>st</sup> in all KPI's variables, except in defensive line breaks, ball progressions, and total defensive pressures applied. About technical issues, previously Kubayi (2020) reported that the highest number of goals was yielded from the final third (35%) when compared to the first and middle thirds. Also, most goals were preceded by short passes (69.9%), while 13.6% of goals came from long passes and 16.5% from mixed passes. Our study only recorded differences between the CAF and UEFA national teams, all of which were offensive possession variables, specifically: possession, total shot attempts, total passes, total passes completed, passes completed, line breaks completed, and receptions in the final third. Yi et al. (Yi et al., 2019) showed that possession-play outperformed direct-play-characterized teams in all variables relating to goal-scoring, attacking, and passing and covered more distance in sprints and high-intensity running. Both possession- and direct-play teams scored greater values in passing, pass accuracy, and delivery into the offensive third while playing against direct-play teams than when playing against possession-play teams.

The differences between UEFA and CAF teams may be associated with the styles of play implemented in each continuum. Culturally, the African teams tend to potentiate speed and fast attacking/attacking, while the European teams tend to be more tactically solid and with a more possession-oriented game (Clemente et al., 2015). Kessouri (2023) determined the match performance difference between the Top Five African national teams in the group stage of the 2022-WC, concluding that total shots, shots on target, shooting from open play, possession, total passes, passing accuracy, short passes, long ball accuracy, and key passes. In contrast, the African teams played more long balls, committed many fouls, made more clearances and saves by goalkeepers, and received more yellow cards than there. This style of play also tends to be present in European teams (Castellano & Pic, 2019; Hewitt et al., 2016). Indeed, most of what distinguishes these teams are cultural impact, with particular playing style of developed throughout time. They also included strategic and tactical considerations, player qualities, and the coach's philosophy (Castellano & Pic, 2019; Sarmiento et al., 2013). Although there are already many African players in the main European leagues, many of them central figures in their teams, these players tend to play tactical roles associated with progression and mobility (Baloyi & Bekker, 2011). Previous network-based studies reported a small positive correlation with total connections, network density and clustering coefficient. High levels of goals scored were associated with high levels of total connections, net density, and clustering coefficient (Clemente, 2018). That is, these activity profiles tend to be influenced by the type of activity and/or match running performance, being highly dependent on contextual factors, the tactical system, and the competition phase itself (Clemente et al., 2020). Also, there is an optional influence in the match running performance among winger players vs. exterior defenders. Central forwards had significant drops in degree prestige when compared to exterior defenders and central defenders, defensive midfielders, and midfielders. When passing network centrality levels were

compared across won and lost matches, there were minor gains in degree prestige among midfielders and small increases among strikers among the winners (Clemente et al., 2015).

Current research can help coaches, analysts, and sports scientists with performance construction profiles for teams with diverse tactical approaches, as well as the development of training routines, to optimize playing style. As a limitation, it can be pointed out the fact that the analysis only reports average values for the teams of each confederation and classification, making it necessary to individualize the data for each player and/or team (Aquino et al., 2019; Teixeira et al., 2022). Future research should influence how playing styles and advancing competition influence differences in physical, technical, and tactical performances of the 32 teams that participated in the 2022-WC. Likewise, future studies should compare the results obtained in the final phase with the training and qualification phases in order to identify patterns and similarities that may predict the physical, technical, and tactical performances (Teixeira et al., 2021).

## CONCLUSIONS

This current research confirmed differences between national teams when capering by FIFA ranking in several KPI's variables (such as possession, total attempts at goal, total attempts on target, total passes, total complete passes, pass completion, completed line breaks, defensive line breaks, receptions in the final third, and ball progressions.). Relating FIFA confederations, significant differences were found CAF and UEFA national teams for possession, total attempts on target, total passes, total complete passes, pass completion, completed line, and receptions in the final third, showing an explicit difference between confederation in KPI. Future research should investigate how playing styles and advancing competition influence the differences in physical, technical, and tactical performances of the 32 teams that participated in the 2022-WC.

## AUTHOR CONTRIBUTIONS

LB: conceptualization, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing—original draft, writing—review and editing. EF: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, resources, software, supervision, visualization, writing—original draft, writing—review and editing. JT: investigation, writing—original draft, writing—review and editing. NV: writing—original draft, writing—review and editing. TR: writing—original draft, writing—review and editing. RT: conceptualization, data curation, funding acquisition, project administration, supervision, validation, visualization, writing—original draft, writing—review and editing. PF: investigation, writing—original draft, writing—review and editing. RF: conceptualization, data curation, funding acquisition, project administration, supervision, validation, writing—original draft, writing—review and editing, resources.

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## DISCLOSURE STATEMENT

No potential conflict of interest were reported by the authors.

## REFERENCES

- Alves, D. L., Osiecki, R., Palumbo, D. P., Moiano-Junior, J. V. M., Oneda, G., & Cruz, R. (2019). What variables can differentiate winning and losing teams in the group and final stages of the 2018 FIFA World Cup? *International Journal of Performance Analysis in Sport*, 19(2), 248-257. <https://doi.org/10.1080/24748668.2019.1593096>
- Andersson, S., Bengtsson, L., & Svensson, Å. (2021). Mega-sport football events' influence on destination images: A study of the of 2016 UEFA European Football Championship in France, the 2018 FIFA World Cup in Russia, and the 2022 FIFA World Cup in Qatar. *Journal of Destination Marketing & Management*, 19, 100536. <https://doi.org/10.1016/j.jdmm.2020.100536>
- Aquino, R., Machado, J. C., Manuel Clemente, F., Praça, G. M., Gonçalves, L. G. C., Melli-Neto, B., Ferrari, J. V. S., Vieira, L. H. P. P., Puggina, E. F., & Carling, C. (2019). Comparisons of ball possession, match running performance, player prominence and team network properties according to match outcome and playing formation during the 2018 FIFA World Cup. *International Journal of Performance Analysis in Sport*, 19(6), 1026-1037. <https://doi.org/10.1080/24748668.2019.1689753>
- Aquino, R., Marques, R. F. R., Petiot, G. H., Gonçalves, L. G. C., Moraes, C., Santiago, P. R. P., & Puggina, E. F. (2016). Relationship between procedural tactical knowledge and specific motor skills in young soccer players. *Sports*, 4(4), 52. <https://doi.org/10.3390/sports4040052>
- Arslan, E., Ozer, G., & Clemente, F. (2020). Running-based high-intensity interval training vs. small-sided game training programs: effects on the physical performance, psychophysiological responses and technical skills in young soccer players. *Biology of Sport*, 37(2), 165-173. <https://doi.org/10.5114/biolsport.2020.94237>
- Baloyi, L., & Bekker, M. (2011). Causes of construction cost and time overruns : The 2010 FIFA World Cup stadia in South Africa. *Acta Structilia*, 18(1), 51-67.
- Branquinho, L., Ferraz, R., & Marques, M. C. (2021). 5-a-Side Game as a Tool for the Coach in Soccer Training. *Strength & Conditioning Journal*, 43(5), 96-108. <https://doi.org/10.1519/SSC.0000000000000629>
- Castellano, J., & Pic, M. (2019). Identification and preference of game styles in laliga associated with match outcomes. *International Journal of Environmental Research and Public Health*, 16(24), 5090. <https://doi.org/10.3390/ijerph16245090>
- Cea, S., Durán, G., Guajardo, M., Sauré, D., Siebert, J., & Zamorano, G. (2020). An analytics approach to the FIFA ranking procedure and the World Cup final draw. *Annals of Operations Research*, 286, 119-146. <https://doi.org/10.1007/s10479-019-03261-8>
- Chadwick, S., Widdop, P., Anagnostopoulos, C., & Parnell, D. (2022). *The Business of the FIFA World Cup*. Routledge. <https://doi.org/10.4324/9781003121794>
- Clemente, F. M. (2018). Performance outcomes and their associations with network measures during FIFA World Cup 2018. *International Journal of Performance Analysis in Sport*, 18(6), 1010-1023. <https://doi.org/10.1080/24748668.2018.1545180>
- Clemente, F. M., Martins, F. M. L., Kalamaras, D., Wong, D. P., & Mendes, R. S. (2015). General network analysis of national soccer teams in Fifa World Cup 2014. *International Journal of Performance Analysis in Sport*, 15(1), 80-96. <https://doi.org/10.1080/24748668.2015.11868778>
- Clemente, F. M., Sarmiento, H., & Aquino, R. (2020). Player position relationships with centrality in the passing network of world cup soccer teams: Win/loss match comparisons. *Chaos, Solitons and Fractals*, 133, 109625. <https://doi.org/10.1016/j.chaos.2020.109625>
- Csató, L. (2023). Quantifying the unfairness of the 2018 FIFA World Cup qualification. *International Journal of Sports Science & Coaching*, 18(1), 183-196. <https://doi.org/10.1177/17479541211073455>

- da Mota, G. R., Thiengo, C. R., Gimenes, S. V., & Bradley, P. S. (2016). The effects of ball possession status on physical and technical indicators during the 2014 FIFA World Cup Finals. *Journal of Sports Sciences*, 34(6), 493-500. <https://doi.org/10.1080/02640414.2015.1114660>
- Durán, G., Guajardo, M., & Sauré, D. (2017). Scheduling the South American Qualifiers to the 2018 FIFA World Cup by integer programming. *European Journal of Operational Research*, 262(3), 1109-1115. <https://doi.org/10.1016/j.ejor.2017.04.043>.
- Ferguson, C. J. (2009). An Effect Size Primer: A Guide for Clinicians and Researchers. *Professional Psychology: Research and Practice*, 40(5), 532-538. <https://doi.org/10.1037/a0015808>
- Fernandez-Navarro, J., Fradua, L., Zubillaga, A., & McRobert, A. P. (2019). Evaluating the effectiveness of styles of play in elite soccer. *International Journal of Sports Science and Coaching*, 14(4), 514-527. <https://doi.org/10.1177/1747954119855361>
- Filetti, C., Ruscello, B., D'Ottavio, S., & Fanelli, V. (2017). A Study of Relationships among Technical, Tactical, Physical Parameters and Final Outcomes in Elite Soccer Matches as Analyzed by a Semiautomatic Video Tracking System. *Perceptual and Motor Skills*, 124(3), 601-620. <https://doi.org/10.1177/0031512517692904>
- Gasparetto, T., & Barajas, A. (2020). The competitiveness of football at the national-team level. In *Outcome Uncertainty in Sporting Events* (pp. 94-113). Edward Elgar Publishing. <https://doi.org/10.4337/9781839102172.00012>
- Goes, F. R., Meerhoff, L. A., Bueno, M. J. O., Rodrigues, D. M., Moura, F. A., Brink, M. S., Elferink-Gemser, M. T., Knobbe, A. J., Cunha, S. A., Torres, R. S., & Lemmink, K. A. P. M. (2021). Unlocking the potential of big data to support tactical performance analysis in professional soccer: A systematic review. *European Journal of Sport Science*, 21(4), 481-496. <https://doi.org/10.1080/17461391.2020.1747552>
- Goslin, A. E., & Mosola, M. E. (2020). Towards a viable business model for the management of professional football in Africa. *African Journal for Physical Activity and Health Sciences (AJPHEs)*, 26(1), 1-20. <https://doi.org/10.37597/ajphes.2020.26.1.1>
- Hewitt, A., Greenham, G., & Norton, K. (2016). Game style in soccer: What is it and can we quantify it? *International Journal of Performance Analysis in Sport*, 16(1), 355-372. <https://doi.org/10.1080/24748668.2016.11868892>
- Hopkins, W. G., Marshall, S. W., Batterham, A. M., & Hanin, J. (2009). Progressive statistics for studies in sports medicine and exercise science. *Medicine and Science in Sports and Exercise*, 41(1), 3-12. <https://doi.org/10.1249/MSS.0b013e31818cb278>
- Kessouri, O. (2023). Match performance difference between African and Top Five teams in the group stage of the 2022 World Cup. *Trends in Sport Sciences*, 30(1), 5-11. <https://doi.org/10.23829/TSS.2023.30.1-1>
- Kubayi, A. (2020). Analysis of Goal Scoring Patterns in the 2018 FIFA World Cup. *Journal of Human Kinetics*, 71(1), 205-210. <https://doi.org/10.2478/hukin-2019-0084>
- Kubayi, A., & Toriola, A. (2019). The influence of situational variables on ball possession in the South African Premier Soccer League. *Journal of Human Kinetics*, 66, 175. <https://doi.org/10.2478/hukin-2018-0056>
- Kubayi, A., & Toriola, A. (2020). Differentiating African Teams from European Teams: Identifying the Key Performance Indicators in the FIFA World Cup 2018. *Journal of Human Kinetics*, 73(1), 203-208. <https://doi.org/10.2478/hukin-2019-0144>
- Lago-Peñas, C. (2012). The role of situational variables in analysing physical performance in soccer. *Journal of Human Kinetics*, 35, 89. <https://doi.org/10.2478/v10078-012-0082-9>

- Lago-Peñas, C., & Dellal, A. (2010). Ball possession strategies in elite soccer according to the evolution of the match-score: The influence of situational variables. *Journal of Human Kinetics*, 25(1), 93-100. <https://doi.org/10.2478/v10078-010-0036-z>
- Lepschy, H., Wäsche, H., & Woll, A. (2018). How to be Successful in Football: A Systematic Review. *The Open Sports Sciences Journal*, 11(1), 3-23. <https://doi.org/10.2174/1875399X01811010003>
- Maneiro, R., Losada, J. L., Casal, C. A., & Ardá, A. (2020). The Influence of Match Status on Ball Possession in High Performance Women's Football. *Frontiers in Psychology*, 11, 487. <https://doi.org/10.3389/fpsyg.2020.00487>
- Modric, T., Versic, S., Sekulic, D., & Liposek, S. (2019). Analysis of the association between running performance and game performance indicators in professional soccer players. *International Journal of Environmental Research and Public Health*, 16(20), 4032. <https://doi.org/10.3390/ijerph16204032>
- Musa, R. M., Abdul Majeed, A. P. P., Abdullah, M. R., Nasir, A. F. A. B., Hassan, M. H. A., & Razman, M. A. M. (2019). Technical and tactical performance indicators discriminating winning and losing team in elite Asian beach soccer tournament. *PLoS ONE*, 14(6), e0219138. <https://doi.org/10.1371/journal.pone.0219138>
- Pino-Ortega, J., Rojas-Valverde, D., Gómez-Carmona, C. D., & Rico-González, M. (2021). Training Design, Performance Analysis, and Talent Identification-A Systematic Review about the Most Relevant Variables through the Principal Component Analysis in Soccer, Basketball, and Rugby. *International Journal of Environmental Research and Public Health*, 18(5), 1-18. <https://doi.org/10.3390/ijerph18052642>
- Razmjoo, N., Khalilpour, M., & Ramezani, M. (2016). A New Meta-Heuristic Optimization Algorithm Inspired by FIFA World Cup Competitions: Theory and Its Application in PID Designing for AVR System. *Journal of Control, Automation and Electrical Systems*, 27(4), 419-440. <https://doi.org/10.1007/s40313-016-0242-6>
- Sarmiento, H., Pereira, A., Matos, N., Campaniço, J., Anguera, T. M., & Leitão, J. (2013). English premier league, spain's la liga and italy's serie a-What's different? *International Journal of Performance Analysis in Sport*, 13(3), 773-789. <https://doi.org/10.1080/24748668.2013.11868688>
- Teixeira, J. E., Forte, P., Ferraz, R., Branquinho, L., Silva, A. J., Monteiro, A. M., & Barbosa, T. M. (2022). Integrating physical and tactical factors in football using positional data: a systematic review. *PeerJ*, 10, e14381. <https://doi.org/10.7717/peerj.14381>
- Teixeira, J. E., Forte, P., Ferraz, R., Leal, M., Ribeiro, J., Silva, A. J., Barbosa, T. M., & Monteiro, A. M. (2021). Monitoring Accumulated Training and Match Load in Football: A Systematic Review. *International Journal of Environmental Research and Public Health*, 18(8). <https://doi.org/10.3390/ijerph18083906>
- Tuo, Q., Wang, L., Huang, G., Zhang, H., & Liu, H. (2019). Running performance of soccer players during matches in the 2018 FIFA world cup: Differences among confederations. *Frontiers in Psychology*, 10(MAY), 1-6. <https://doi.org/10.3389/fpsyg.2019.01044>
- Yi, Q., Gómez, M. A., Wang, L., Huang, G., Zhang, H., & Liu, H. (2019). Technical and physical match performance of teams in the 2018 FIFA World Cup: Effects of two different playing styles. *Journal of Sports Sciences*, 37(22), 2569-2577. <https://doi.org/10.1080/02640414.2019.1648120>



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