

## Qatar 2022 World Cup Scorer Analysis

### Análisis de goleadores del mundial de Qatar 2022

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**Abstract.** Football is the most famous place in the whole world; millions of people want to watch the great match of world football, the FIFA World Cup 2022, especially after two limited years without spectators due to the COVID-19 pandemic. The purpose of the study was to compare (the limbs that scored the most goals with the right and left feet, goals with the head, and penalty kicks. Age of goal scorers <30 and > 30 years. Goals that occurred inside the penalty box and outside the penalty box. First-half and second-half goals. Analysis of goal creation in 2022 World Cup matched with a total of (n=64) matches with a total of 166 goals and 2 own goals in 90 minutes of normal time, 4 goals in additional time 2x15 minutes (average=2.68 goals per game). The analysis was carried out by hand notation. The analysis of goal scorers categorized by age groups indicated that players below the age of 30 accounted for 30.95% of the overall goals, whereas those above the age of 30 provided 41.66%. Notable patterns included the significant utilization of the right foot (41.66%) and major involvement of the left foot (30.95%). In addition, goals scored using the upper limbs or head made up 16.67% of the total, while penalty goals represented 9.52%. Then goals were scored by players aged <30 years 110 (66.3%) and goals from players aged 56 (33.7%). In the first half, goals were created 67 (39.88%), and in the second half, 101 (60.11%). There were 153 (91.07%) goals scored in the penalty box and 13 (7.73%) outside the penalty box. The golden age of footballers was still very real in contributing to the creation of goals in the World Cup; it was evident that 2/3 of the World Cup goals were created by players under 30 years old. In today's modern football, scoring goals with the right or left foot is comparable to the program implemented by the coach that requires every player to use both feet in any situation. Among all the goals scored, about 3.72% were accomplished with the right foot, which made a notable contribution to the total number of goals. Goals scored with the left foot constituted approximately 2.77% of the total, demonstrating the adeptness of players in utilizing both feet proficiently in scoring goals. Head strikes, was accounting for around 1.49% of all goals, highlight the significance of aerial skills and accuracy in scoring. Penalty kicks, a unique indicated of scoring goals, accounted for around 0.85% of the total goals, emphasizing the strategic importance of set-piece scenarios in a team's overall success.

**Keywords:** World Cup, Goal scorer's limbs, Goal scorer's age, Goal 90 minutes

**Resumen.** El fútbol es el lugar más famoso del mundo; Millones de personas quieren ver el gran partido del fútbol mundial, la Copa Mundial de la FIFA 2022, especialmente después de dos años limitados sin espectadores debido a la pandemia de COVID-19. El objetivo del estudio fue comparar (las extremidades que más goles marcaron con el pie derecho e izquierdo, goles con la cabeza y tiros penales). Edad de los goleadores < 30 y > 30 años. Goles ocurridos dentro del área penal. y fuera del área de penalti Goles en el primer tiempo y segundo tiempo Análisis de la creación de goles en el Mundial 2022 coincidentes con un total de (n=64) partidos con un total de 166 goles y 2 goles en propia meta en 90 minutos del tiempo normal, 4 goles en el tiempo suplementario 2x15 minutos (media=2,68 goles por partido). El análisis se realizó mediante anotaciones manuales. El análisis de los goleadores categorizados por grupos de edad indicó que los jugadores menores de 30 años representaron el 30,95% del total goles, mientras que los mayores de 30 años aportaron el 41,66%, destacando la utilización significativa del pie derecho (41,66%) y la mayor afectación del pie izquierdo (30,95%). Además, los goles marcados con las extremidades superiores o la cabeza supusieron el 16,67% del total, mientras que los goles de penalti representaron el 9,52%. Luego los goles los marcaron jugadores menores de 30 años 110 (66,3%) y los goles de jugadores de 56 años (33,7%). En la primera parte se crearon 67 goles (39,88%) y en la segunda parte 101 (60,11%). Se marcaron 153 (91,07%) goles dentro del área y 13 (7,73%) fuera del área. La época dorada de los futbolistas aún era muy real al contribuir a la creación de goles en el Mundial; Era evidente que 2/3 de los goles del Mundial fueron creados por jugadores menores de 30 años. En el fútbol moderno actual, marcar goles con el pie derecho o con el izquierdo es comparable al programa implementado por el entrenador que exige que cada jugador utilice ambos pies en cualquier situación. Entre todos los goles marcados, alrededor del 3,72% fueron logrados con el pie derecho, lo que contribuyó de manera notable al número total de goles. Los goles marcados con el pie izquierdo constituyeron aproximadamente el 2,77% del total, lo que demuestra la habilidad de los jugadores a la hora de utilizar ambos pies con soltura para marcar goles. Los golpes de cabeza, que representaron alrededor del 1,49% de todos los goles, resaltan la importancia de las habilidades aéreas y la precisión en el gol. Los tiros penales, un indicador único de marcar goles, representaron alrededor del 0,85% del total de goles, lo que enfatiza la importancia estratégica de los escenarios de jugadas a balón parado en el éxito general de un equipo.

**Palabras clave:** Mundial, Extremidades del goleador, Edad del goleador, Gol 90 minutos

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### Introduction

Football, as part of the civilization of every nation in its history, has proven to have an effective impact on the progress of every country (Rustamaji, 2020; Wartamana et

al., 2021). It is proven that world football matches are the most awaited thing (Hardinata et al., 2023; Supartha et al., n.d.; Yuzi et al., 2020) for every citizen around the world. Football has been everywhere in every country. When a football tragedy occurred in Indonesia in 2022, the whole

world expressed sympathy for what happened at Kanjuruhan (Fitrialdi, 2020; Kamshino, 2020). The year 2022 will become part of great football around the world. At the end of 2022, the World Cup will be held with host Qatar. Football as an ongoing industry has also experienced various declines in the Covid-19 pandemic situation.

The Qatar World Cup is also a revival for world football because it provides great interest for all countries to participate, support, and watch the World Cup in Qatar (Ambarita et al., 2022; Ananda & Aryani, 2021; Prakasa, 2023). This study excludes the complex technical and tactical skills typically discussed in academic conversations and focuses solely on the profound social aspects of football. The World Cup, a four-year event that has become an essential part of the worldwide football scene, captivates adults. The odyssey of the top 32 nations, maneuvering through rigorous qualifying rounds and playoffs, ends in the shared sense of honor of participating in the highly esteemed World Cup phase. People around the world eagerly await the Qatar 2022 World Cup. This event showcases soccer's capacity to go beyond its athletic nature and become a significant cultural and social phenomenon with global significance (Cholid, 2017). Technological assistance also provides decisions that help the referee with camera results and sensors in the ball (Adriani & Irwandy, 2020; Salam et al., 2021). It is still clear in memory when Japan's second goal against Spain that the ball seen in the technology system has not left the field (Armenteros et al., 2019; Buchheit et al., 2014; Lucic et al., 2020; Spitz et al., 2021).

Football can be played with all members of the body except the hands because only the goalkeeper can do it using his hands and only in the penalty box (Nugraha, 2012). Players carry out all of these body parts in an effort to play on the field, with techniques in passing, dribbling, control, and shooting matches. The cheering of the audience will be created when, in the match, there is a player attempts to put the ball into the opponent's goal or a goal is scored (Luxbacher, 2013). Members of this body take advantage of the situation by scoring goals with various efforts. Scoring a goal brings pride and joy, as it not only contributes to the nation's positive reputation in a victory but also evokes disappointment when the ball finds its way into the team's own goal or is conceded by the opponent (Ihsan et al., 2022; Okilanda et al., 2021a). In addition to any limb that can score goals, in every football match, there will be a fierce battle when the goal is one difference because this goal makes the opponent try to score maximum goals. The other team defends the goal by conceding with the maximum (Okilanda et al., 2021a).

Football matches always present attractive appearances of world-class players in every edition of the World Cup. Because a new star will appear that will shine in the World Cup. Likewise, famous players will appear as a differentiator in every game. These best players will bring a lot of spectator interest to watch the World Cup matches to completion. The age of 18 to 29 years is the golden age for

world players with high-level abilities, but there are also players who are present at the World Cup for the first time starting at the age of 17 (González et al., 2022). Players over the age of 30 will also continue to show leadership in every edition of the World Cup. The best scorers are also many of the players who already have much experience in the World Cup. Goals that occur not only in the first half but also in the second half will be realized because, in the last 10 minutes of the game, every team is always racing to be able to score goals. Scoring goals is the main determinant of the overall performance of a soccer team (Almeida et al., 2022; Mitrotasios et al., 2022; Rodenas et al., 2020). Another perspective, scoring goals can be from inside/outside the penalty box.

Apart from many things, football is always awaited by everyone who watches it, so it is very important at any time in the edition of a football match to wait for which player has scored the most goals in one championship. Kylian Mbappe of France established himself as the top scorer of the 2022 World Cup, showcasing his influence by scoring an impressive total of eight goals. This achievement not only underscores Mbappe's prowess but also serves as a focal point for the research study, which delves into the intricacies of his goal-scoring techniques, the manner in which he executed them, and the pivotal moments within the games where his contributions significantly shaped the outcomes. Not only did the 90 minutes of the 2022 World Cup edition produce goals in 2x15 minutes of extra time and goals that occurred in penalty shootout matches, but Previous research focused on the analysis of goals scored during the World Cup and EURO Champions such as World Cup FIFA 2018 Russia (Kubayi, 2020), World Cup FIFA 2014 Rio De Janeiro Brazil (Mićović et al., 2023), South Africa World Cup 2010, Germany World Cup 2006, edition 2010, 2014, 2016 Championship EURO host France (Alves et al., 2023) and 2012 EURO host Poland (de Rellán Guerra et al., 2023). This study examined the goal-scoring patterns in 14 FIFA World Cups spanning from 1966 to 2018 (Çobanoğlu, 2019). It analyzed a total of 1881 goals scored in 732 matches using the observational methodology. A data entry process was devised prior to the independent video analysis conducted by four proficient examiners, demonstrating robust dependability. The study observed a notable inclination towards an increase in goals resulting from set plays and coordinated movements during open play.

Nevertheless, the Chi-square test did not reveal any noteworthy disparities in goal-scoring patterns or zones. Most goals happened between the 76th and 90th minutes (22.7%), from open play (70.5%), within the penalty area (54.7%), with one-touch finishing (62.5%), and involving collective attacks in open play (55.8%). While valuable, the study lacks extensive analysis of contextual elements driving goal-scoring trends, providing potential for future research to expand understanding. (Mićović et al., 2023).

This research presented the great goals that occurred during the 90 minutes of the 2022 World Cup. Researchers

wanted to analyze which great goalscorers analyze for goal (Bahtra et al., 2023; Bahtra & Asmawi, 2021) also occur with which limbs and at what age the players are. Besides that, there have been scoring periods (first and second half duration. Minutes games 15, 30, 45, 60, 75, and 90) and area (inside and out of the box) during the World Cup 2022 Qatar Tournament. Therefore, this study aimed to identify score goal patterns. Because there was a paucity of studies analyzing differences in goal scoring with limbs, penalties, and age of goal score divided between ages <30 and ≥30

**Method**

Hand notation analysis was carried out on a total of 166 goals with 2 own goal and 4 goals after 90 minutes. Technology Video (Komaini et al., 2021; Umar et al., 2023) retrieved from the database (<https://www.fifa.com/fifaplus/en/watch>) and YouTube (<https://www.vidio.com/watch/>). To ensure precision and uniformity, we employed a series of meticulously delineated procedures in our observational methodology for this study. Three personnel meticulously analyzed the goal-scoring videos, observing and taking notes on each goal. The purpose of this multi-step procedure was to attain a thorough comprehension of the goal-scoring events. In the first stage, three observers independently analyzed the videos, meticulously recording pertinent information such as the body part utilized by the goal scorer, the kind of goal (penalty or not), and the age group of the goal-scoring players (classified as <30 years and ≥30 years). Subsequent to this initial notation, the observers actively collaborated to harmonize their notes and reach a consensus on the reported specifics for each objective. Observers actively repeated the process of discussion and correction until they achieved a consistent set of observations, ensuring uniformity in recorded data for all objectives. This study defined the body part of the goal scorer, the penalty. Age of goal-scoring players <30 years and ≥ 30 years. The frequency of goals scored in the first and second half of the game (own goals and over 90 minutes of play are ignored) and penalty goals in 90 minutes are included in the results of the analysis of the body parts of the goalscorer. Goal-scoring areas were in positions inside and outside the penalty box. The study compared scorers aged <30 and ≥30 years.

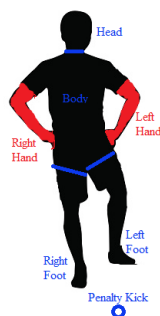


Figure 1. Body Player. Blue: Approve Goals. Red: False Goal

In addition, this study used a comparison of Mann Whitney half and area because the data could be more normal, including goals scored from inside their area. In addition, this study used a paired sample t-test comparison half because the data were not normally distributed. The study analyzed goals inside and outside the penalty area to give a full examination of goal-scoring tendencies. The researchers intended to provide significant insights to the academic community about the spatial dynamics of goal-scoring occurrences by analyzing goals in various places. This methodology enabled a subtle comprehension of scoring patterns both inside and outside the penalty area, providing a more intricate viewpoint on the efficacy of various attacking tactics and contextual elements that influence goal-scoring behavior. By incorporating both domains, the study became more pertinent and practical, offering a comprehensive perspective for scholars and professionals in the academic community.



Figures 2. Penalty Area and Outside Penalty

This study used the methods of intra-reliability and inter-reliability. Two or more measurements were used to determine the reliability of the researcher. In contrast, interreliability was used to measure the same two data from various sources with two or more trials (Cheung & Tai, 2023). After carrying out hand notational data collection, a Cohen's kappa test was also carried out to prove the reliability of the data. The test was carried out by 3 experts who looked at 20 goals randomly, analyzed by the main researcher, and three weeks later, the test was carried out again. The analysis results showed that the data 0.848 was an almost perfect agreement (de Oliveira Santos et al., 2024). Cohen's Kappa test and analysis of all data using JASP were displayed in the form of tables and figures. The result tests the chi-square in the first round and second rounds.

Tabel 1. Cohen's Unweighted kappa

Ratings	Unweighted kappa	SE	95% CI	
			Lower	Upper
Average kappa	0.848			
Expert 1 - Expert 2	1.000	0.000	1.000	1.000
Expert 1 - Expert 3	0.773	0.216	0.350	1.000
Expert 2 - Expert 3	0.773	0.216	0.350	1.000

Note. 20 subjects/items and 3 raters/measurements. Confidence intervals are asymptotic.

**Results and Discussion**

**Research Results**

Result The data showed that in the first and second

half, there were no significant differences in goals that occurred based on the results of the following chi-square analysis:

Table 2. Contingency Tables

Limb		Round		Total
		First round	Second round	
Head	Count	13.000	14.000	27.000
	% within row	48.148 %	51.852 %	100.000 %
Left Foot	Count	21.000	31.000	52.000
	% within row	40.385 %	59.615 %	100.000 %
Penalty	Count	9.000	8.000	17.000
	% within row	52.941 %	47.059 %	100.000 %
Right Foot	Count	23.000	47.000	70.000
	% within row	32.857 %	67.143 %	100.000 %
Total	Count	66.000	100.000	166.000
	% within row	39.759 %	60.241 %	100.000 %

**Goals in the first and second half are important for the team to score goals.**

Chi-Squared Tests		
Value	df	p
X <sup>2</sup> 3.427	3	0.330
N	166	

Figure 2 fields goalscorers aged <30 years (%) and scorers aged ≥30 years (%). Goals with limbs left foot (30.95%), right foot (41.66%), chest and shoulders (0), goals with heads (16.67%) and penalties (9.52%). In the first half, goals were scored (40%), and goals in the second half (60%). Goals were made inside the penalty box (91.07%) and outside the penalty box (8.97%).

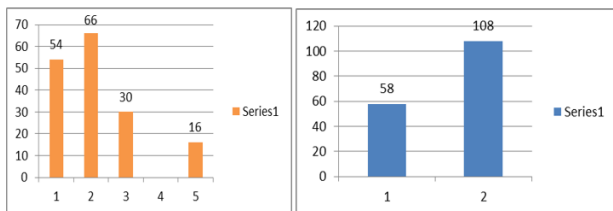


Figure 3. Histogram of Orange Goals scored by limbs and Blue Goals according to the age of the players

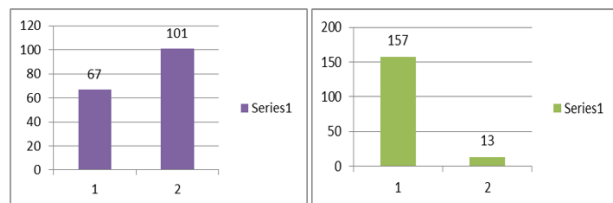


Figure 4. Histogram of purple goals in half 1 or 2 and green goals inside or outside the penalty box

Based on Table 2, the results showed that the goal process with left-footed shots was 52 goals created, from right-footed shots, 70 goals were created from headers, 28 goals were from penalty kicks were created, 16 goals, and 02 from own goals. Of the total 166 goals were scored by the right foot, the majority of the goals occurred. The

exercises performed maximize the active use of the right foot in any football coaching.

Table 3. Based on the frequency of scoring goals.

	Left Foot	Right foot	Head	Body	Penalty	Total
The process of limb goals	52	70	28	0	16	166

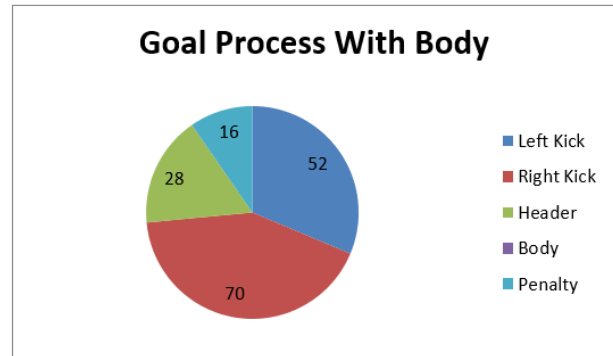


Figure 5. Goalscorer's Body

Table 2. Paired Samples T-Test

measure 1	measures 2	W	z	df	p.s
Left Foot	- Right Foot	1,000	-1,753	0.106	
Penalty Boxes	- Out of the Box	28,000	2,366	0.016	

Note. Wilcoxon signed-rank test.

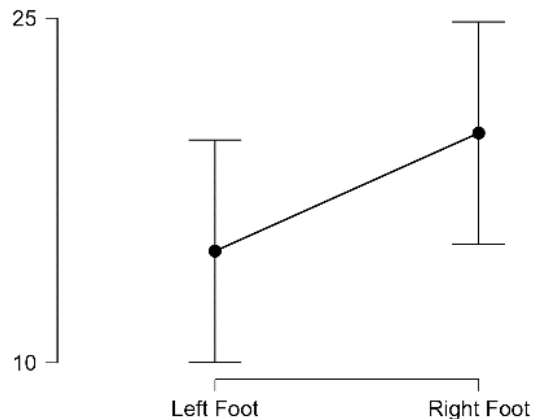


Figure 6. Left Foot - Right Foot

The difference between the left foot and the right foot in scoring goals was not too significant even though the goals scored by the right foot dominate with quite a lot of goals scored, but this made football players in the modern era have the same quality left and right foot kicks.

The goals scored in the World Cup in the penalty area and outside the penalty box were very significant because, in the modern football era, scoring inside the penalty box was the most effective way of combining to score goals.

The Qatar 2022 World Cup match was also the World Cup match with the most goals scored in the last decade and features a unique final with many goals totaling 6 goals.

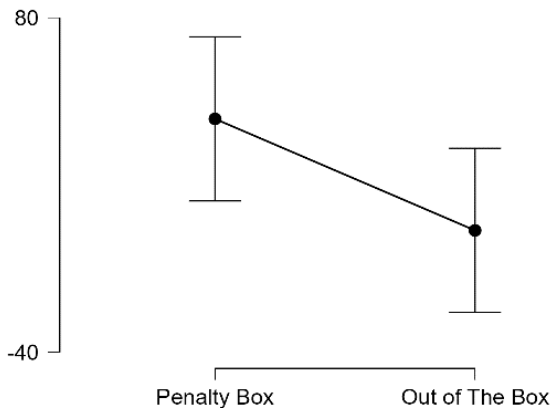


Figure 7. Penalty Box - Out of The Box

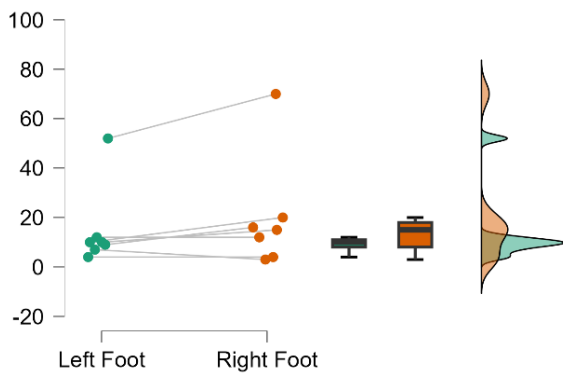


Figure 8. Left Foot - Right Foot

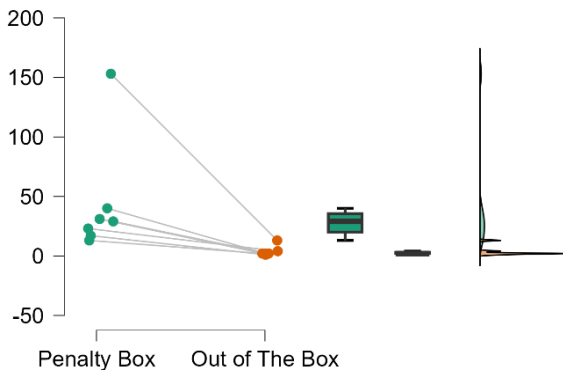


Figure 9. Penalty Box - Out of The Box

## Discussion

The numbers and tables offered provide a comprehensive analysis of the goal-scoring patterns in the Qatar 2022 World Cup, offering detailed insights into several aspects of the game. Figure 2 explored the varied contributions of different age groups, specifically focusing on player age and scoring limbs. It revealed that players aged less than 30 years provided 30.95% of the total goals, while players aged 30 years and beyond contributed 41.66%. The distribution of goals by limbs highlights the dominance of right-footed shots was (41.66%) and the significant contribution of left-footed shots (30.95%). Significantly, the data also highlights the significance of goals scored through headers

(16.67%) and penalties (9.52%), emphasizing the diverse range of methods used to score goals.

Figure 2 analyzed the distribution of goals in terms of time, dividing it into the first half (40%) and the second half (60%). This breakdown offered detailed insights into how the dynamics of goal-scoring change throughout the encounter. Concurrently, the vast majority of goals that take place within the penalty box (91.07%) highlighted the crucial significance of placement for achieving success in scoring goals.

Figures 3 and 4 provided additional support for the topic by graphically illustrating the correlation between player age and limb preference using histograms. These charts provided a detailed perspective on how various age groups exhibit preferences for particular limbs when it comes to scoring goals. The statistical analysis in Table 2, utilizing a paired samples T-test, highlighted the significant involvement of the right foot in goal-scoring activities.

Figure 6 enhanced the discussion by contrasting the scoring of the left and right feet, demonstrating the numerical superiority of the right foot. Nevertheless, the Wilcoxon signed-rank test revealed that this disparity lacks statistical significance. It underscores the modern football player's adeptness in executing kicks with both their left and right foot and showcasing a well-rounded set of skills.

Figure 7 highlighted the strategic importance of goals scored within the penalty area (91.07%) compared to those scored outside, in line with contemporary football tactics. The conducted statistical test further validated that scoring within the penalty box is a more efficient strategy, offering crucial insights into the spatial dynamics of goal-scoring.

Figures 8 and 9 presented a thorough overview of the Qatar 2022 World Cup, highlighting its unique status as the tournament with the highest number of goals scored in the past ten years. The exceptional conclusion, characterized by six goals, contributed a remarkable element to the overall storyline of the tournament, emphasizing its importance in the world of international football competitions. These figures and tables provided a comprehensive and exhaustive analysis of goal-scoring tendencies in one of the world's top football competitions. They cover various aspects such as player demographics, limb preferences, temporal dynamics, and spatial factors, giving a holistic knowledge of the topic.

In the findings of goals made using the limbs of the goalscorer with the right foot and left foot, there is no significant difference. The findings from the results of the analysis carried out by watching the video repeatedly are that the player will score in any position where the ball is closest to the player's feet; this is also supported by the current type of football player who always wants to control the ball or can shoot with both feet. So that the goals on the left foot and right foot do not experience a significant difference. Likewise, in the upper limbs, heads and penalty goals scored from headers are quite significant compared to goals scored from the penalty spot. More

goals were scored with their heads because the playing pattern of the team that made direct passes to the front of the goal to score goals was mostly done with gastric baits. Today's modern football players rarely accelerate dribbling the ball into the goal, so the penalties for penalties are very few, especially since some of the penalties given in the World Cup are more for handball due to opposing players who block.

The research findings showed that significantly the 2022 World Cup shows a higher percentage of attempts to score goals in the world cup with (91.07%) in the penalty box, showing that scoring percentage goals from inside the box (87.7%) Copa America 2022, higher compared to World Cup 2018 Russia (84.7%) (Çobanoğlu, 2019), 2010 World South Africa (82.1%) and World Cup 2006 Germany (81%), while lower than 2014 World Cup Rio De Janeiro (89.9%) (Rumpf et al., 2017). The modern game of football provided that the ball is sent to the area of the penalty box. which is the target of the attack by placing more attackers than the opponent's defenders. The results of the 2022 World Cup matches also showed results that are in line with Kvas-Cabral's study (2022) that European teams have a greater chance of scoring when spending more time in the final third and in the penalty area, which may directly explain why goals score inside box significantly higher than out of the box.

## Conclusion

The average age of players under 30 years was more than the average age of over 30 years, providing fast and best movements. These players also contributed greatly to every goal scored. Players under 30 years have an average age higher than those over 30 years, deliver swift and superior movements, and contribute considerably to every goal scored, which is not expressly supported by the offered discussion. The discussion focused on the distribution of goal scorers depending on age categories, indicating that players aged <30 years produced 30.95% of the total goals, while those aged ≥30 years provided 41.66%. Nevertheless, the age-based contribution to goals does not necessarily suggest that players under the age of 30 have a greater average age. The debate emphasized the prevalence of right-footed shots (41.66%) and notable contributions from left-footed shootings (30.95%), headers (16.67%), and penalties (9.52%). However, it did not explore the individual movement attributes or velocity of players according to different age groups. In order to support faster and superior movements among players under 30, it is necessary to obtain more comprehensive data and conduct a thorough investigation on the speed and agility of players in each age group. To bolster this argument, further study or analysis may incorporate detailed data on the average age of players in both groups, along with insights into their speed, agility, and general performance. It would provide a more thorough basis for stating the relationship between age, movement ability,

and goal contributions in the context of the Qatar 2022 World Cup.

The development of football, which has created many young players in every country due to the factor of better modern football development (Okilanda et al., 2021b), including in every competition in the best leagues, provides many opportunities for young players from any country to play and contribute professionally. Comparable to how to score a goal, the comparison of both left and right players' feet is equally good in scoring goals because modern football players have more ability to shoot with both left and right feet equally well in every situation and match situation. The given discourse needs to fully substantiate the claim that players under the age of 30 possess a higher average age than those over 30, exhibit swift and superior moves, and make substantial contributions to every goal scored. The discussion centered on the allocation of goal scorers according to age categories, revealed that players under the age of 30 accounted for 30.95% of the overall goals, and those aged 30 years or older provided 41.66%. Nevertheless, the age-based contribution to goals does not necessarily suggest that players under 30 possess a greater average age. The debate emphasized the prevalence of right-footed shots (41.66%) and notable contributions from left-footed shootings (30.95%), headers (16.67%), and penalties (9.52%). However, it did not explore the precise movement attributes or velocity of players categorized by age groups. In order to validate the claim about the increased speed and agility of players under 30, it is necessary to obtain more comprehensive data and conduct a thorough investigation of the movement capabilities of players in different age groups. Future studies or investigations could include exact numbers about the average age of people in both groups, as well as information about their speed, dexterity, and overall ability. This would offer a more extensive foundation for establishing the correlation between age, mobility ability, and goal contributions within the framework of the Qatar 2022 World Cup.

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