Original Article

Relevant statistical observations in the basketball competitions of 2014 and 2019 Men's Basketball World Cups

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Abstract
The objective of this study is to determine whether there are any significant discrepancies between the parameters that affect qualification to the next round up to the Final Four between men's national teams in 2014 and 2019 FIBA World Cups. All matches (n = 168) undertaken during 2014 and 2019 World Cups (Spain, n = 76; China, n = 92) were examined. In 2014, national teams played more inside game and scored over 30 in the paint out of 85.29 total points. The teams scored more than 25 points from the bench because there were starting players and substitutes coming from the bench. However, during the 2019 World Cup, the game seemed to move from the paint to perimeter, attempting 3-point field goals, and scoring more than 24 points per match compared to the teams that were disqualified. Moreover, the teams that qualified to the final round appeared to use more than 15 assists owing to the better ball movement during the attack. In addition, greater attention is paid to free throws, with a success rate of over 73%. Finally, defensive pressure on opponents increased because the teams scored more than 10 points from opponent turnovers.
Keywords: World Cup, performance indicators, inside game, perimeter shots, basketball

Introduction

The strategic and tactical analyses of defense, but mostly of attack (Leite, Baker, & Sampaio, 2009; Ortega, Villarejo, & Palao, 2009; Sampaio et al., 2004), are important factors that affect decisions made by coaches. During the coaching process, coaches encourage the development of skills (Brancazio, 1984; Baumgartner, 1982; Pangman, 1982; Bell, 1973) and physical abilities of players and supplement the tactical and strategic (Gillen, 1993; Sullivan, 1987; Wellenreiter, 1984) details of the team, with the ultimate goal of achieving victory (McCaughan & McKinlay, 1981; Hendry, 1969; Wooden, 1966).

In most top level basketball competitions, such as the European Tournaments among National Teams (Russo, Miglietta, & Izzo, 2012; Escalante, Saavedra, & García-Hermoso, 2010; Gabor Csataljay, Peter O'Donoghue, Mike Hughes and Henriette Dancs 2009; Trninić, Dizdar, & Lukšić, 2002), Olympic Games, (Leicht, Gomez, & Woods, 2017; Milanović, Štefan, Sporiš, & Dinko, 2016), or World Cups (Trnini, Milanovi, Blakovi, Birkiand, Dizdar, 1997), the effort of teams to maximize athletic performance (Gabler, 1988; Grosser, 1986; Mudra, 1980;) over a specific period of the games is a key factor that should be taken under consideration. The teams try to finish in top positions in the groups, which will allow them to qualify (Dogan & Ersoz, 2019) to the next round of the games, with the ultimate goal of reaching the final round and contend for medals in the tournaments. Therefore, coaches use any means of "espionage" to collect as much information as possible about the opponent, with the ultimate goal of optimum preparation for the next match that follows. It is extremely important for the coach to be able to correlate the statistical results (Erculj & Strumbelj, 2015; Gómez, Tsamourtzis, & Lorenzo, 2006; Mendes & Janeira, 2001) of the match with the preparation for the new match by analyzing the individual characteristics of the athletes and the team. By knowing strengths and weaknesses for various statistical categories, such as shots near the basket vs. shots from the perimeter (Erculj & Strumbelj, 2015), point differences in the final score (Sampaio & Janeira, 2003), and points in the final score from fast breaks (Tsamourtzis et al., 2005), the coach can adapt preparation for the next match to achieve desired results. In addition, there are statistical indicators for both attack and defense, which are essential for maximizing the success of the teams.

During attack, the importance of the percentage of field goals and not the number attempted (Slobodan Simović, Jasmin Komić, Bojan Guzina, Zoran Pajić, Milenko Vojvodić 2018; Gómez, Pérez, Molik, Syzman, & Sampaio, 2014; Garcia, Ibanez, De Santos, Leite, & Sampaio, 2013; Ibáñez et al., 2008) has been highlighted as the key indicator that determines teams that have a successful final outcome. In a survey by Gómez et al., 2009, the significance of 2-point shots made has been indicated as a highly significant factor of success. The difference in the number of final points that were scored by a team considerably affected the level of efficiency among the

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teams that either won or lost (Sampaio & Janeira, 2003). A pass to a teammate that results in a basket maximizes the success on the final outcome (Gómez et al., 2010) and is an essential variable for wins.

During defense, defensive rebound is an important individual key skill as well as a planned team effort to claim the ball so that there are more possessions (Gómez, Ibáñez, Parejo, & Furley, 2017; Gomez, Gasperi, & Lupo, 2016; Lorenzo et al., 2010; Ibáñez et al., 2009; Tsamourtzis et al., 2002). This particular skill is a statistically significant indicator that determines the winning and losing teams in these specific top level tournaments (Anthony Leicht et al., 2017a, 2017b). Steals, as a result of pressing defense (Gómez et al., 2010; Ibanez et al., 2008;), are a statistical indicator that is essential for either failure or success. This significance has been also identified in another survey by Garcia et al., 2014. A defensive play to deflect a shot is strongly correlated with the final result, Ibanez et al., 2008; Ibanez et al., 2003. By studying evaluation indicators, Sampaio et al. 2010 have determined that a specific evaluation indicator (i.e., blocks) determined winning teams over losing ones.

The objective of this study is to determine whether there are any significant discrepancies between the parameters that affect qualification up to the Final Four between 2014 and 2019 Men's World Cups and to highlight the game progress by analyzing defensive and offensive performance indicators among national teams from different continents in one of the top basketball tournaments in the world, i.e., the World Cup

Materials and methods
Sample

All matches (n = 168) undertaken during 2014 and 2019 FIBA Men's World Cup (Spain, n = 76; China, n = 92) were examined. Each play to play sheet provided the necessary information for each World Cup game. The instruments used for this study were: a laptop with an installed operating system Windows 10 Pro, MS Office 2010, SportScout STA Version 3.2, and the software pack SPSS 22. Two Men's World Cup tournaments were held, and 56 teams participated. The analysis was performed on the 1st round, 2nd round, quarterfinals, and semifinals. The performance indicators that were analyzed in this specific survey are shown in Table 1.

Table 1. Performance variables recorded from the official box score sheets

1. Win, success as the final outcome
2. Loss, failure as the final outcome
3. 1st quarter score, total points when the 1st quarter ends
4. 2nd quarter score, total points when the 2nd quarter ends
5. 3rd quarter score, total points when the 3rd quarter ends
6. 4th quarter score, total points when the 4th quarter ends
7. Field goal attempts, a shot worth two points-three points if the player shoots from behind the three-point line
8. Field goal attempts made, a basket worth two points-three points if the player shoots from behind the three-point line
9. 2-point field goal attempt, a shot worth two points
10. 2-point field goal made, a basket worth two points
11. 2-point field goal %, the number of 2-point field goals made divided by the number attempted
12. 3-point field goal attempt, a shot worth three points if the player shoots from behind the three-point line
13. 3-point field goal made, a basket worth three points if the player shoots from behind the three-point line
14. 3-point field goal %, the number of 3-point field goals made divided by the number attempted
15. Free throw attempt, an extra shot worth one point that is earned by one team when the other team is penalized for having committed a personal foul
16. Free throw made, an extra shot worth one point that is finished successfully
17. Offensive rebounds, making a shot after it was first unsuccessfully attempted by a teammate with the ball
18. Defensive rebounds, making a shot after it was first unsuccessfully attempted by a member of the opposing team
19. Rebound, either team retrieves a ball after a missed shot
20. Assists, a pass by an offensive player to a teammate that results in a basket
21. Fouls, a foul committed by a defensive player
22. Turnovers, the loss of ball by the offensive team to its opponent before the offensive team has a chance to try for a basket
23. Blocked shot, a defensive play to deflect a shot using a hand or an arm
24. Steals, taking the ball away from a player on the opposite team
25. Points from turnovers are a result of poor ball passing or a violation of rules by the opposite team
26. Second chance points, the team that has the ball after a missed shot
27. Points in the paint, field goals made in the painted area including the foul line and the base line
28. Points from the bench, score from the substitute players sitting on the sideline

Statistical analysis

Descriptive statistics (mean and standard deviation) were used to analyze the data to map team performance indicators during 2014 and 2019 FIBA Basketball World Cups. To compare between two competitions, the t-test for 2 independent samples was used. In addition, the t-test for 2 independent samples was used to evaluate differences between match outcomes. One-way ANOVA was used to compare indicators

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regarding the stage that teams have reached. For all analyzes, SPSS 25.0 was used, and the significance level was set at p < 0.05.

Results

Table 2 shows the data on team performance during 2014 and 2019 FIBA Basketball World Cups. The comparison between two events showed a significant difference in the average field goal [t (302) = −2.725, p = 0.007], average number of three-point attempts [t (302) = −3.682, p < 0.01], average number of rebounds [t (302) = −2.365, p = 0.019], average total rebounds [t (302) = −2.215, p = 0.028], and mean assist number [t (302) = −5.641, p < 0.01]. More detailed results showed that the 2019 event had a higher average of field goals (64.38 ± 7.28 vs. 62.10 ± 7.32), more three-point attempts (24.27 ± 6.30 vs. 21.78 ± 5.48), higher number of defenders (26.43 ± 5.42 vs. 24.97 ± 5.34), rebounds (37.24 ± 6.93 vs. 35.49 ± 6.90), and more assists (18.13 ± 5.58 vs. 14.71 ± 4.98) compared to the 2014 event.

Table 2. Descriptive statistics of team performance for 2014 and 2019 FIBA Basketball World Cups

| | Time | | | | | |
| | 2014 | | 2019 | | | |
	M	SD	M	SD	t	p
First quarter score	18.86	5.60	19.03	5.40	−0.271	0.786
Second quarter score	18.11	5.60	18.71	5.47	−0.943	0.347
Third quarter score	19.32	5.92	19.34	5.42	−0.030	0.976
Fourth quarter score	19.95	5.82	20.60	5.13	−1.035	0.302
Field goal	62.10	7.32	64.38	7.28	−2.725	0.007*
2-point success	20.47	5.33	20.13	4.83	0.587	0.558
2-point attempts	40.32	7.61	39.98	6.53	0.421	0.674
2-point %	51%	9%	59%	10%	0.643	0.735
3-point success	7.53	2.86	8.07	3.24	−1.521	0.129
3-point attempts	21.78	5.48	24.27	6.30	−3.682	<0.01
3-point %	35%	9%	33%	10%	0.924	0.185
Free throw success	13.12	5.91	14.03	6.57	−1.267	0.206
Free throw attempts	18.36	7.58	18.82	7.49	−0.540	0.589
Free throw %	71%	13%	73%	12%	−1.619	0.107
Offensive rebound	10.52	4.09	10.81	3.99	−0.626	0.533
Defensive rebound	24.97	5.34	26.43	5.42	−2.365	0.019*
Total rebound	35.49	6.90	37.24	6.93	−2.215	0.028*
Assist	14.71	4.98	18.13	5.58	−5.641	0.000*
Personal fouls	20.71	3.99	19.82	4.59	1.815	0.070
Turnover	14.36	4.61	13.58	3.56	1.656	0.099
Steals	6.76	3.32	7.30	2.76	−1.541	0.124
Blocks	2.77	2.21	2.84	2.01	−0.299	0.765
Points from opponent mistake	15.30	7.88	15.07	6.57	0.275	0.784
Points from fast break	9.34	7.17	9.71	5.57	−0.507	0.612
Points from second chance	10.44	4.84	9.53	4.77	1.643	0.101
Points from inside	33.06	10.65	33.92	9.80	−0.730	0.466
Points from the bench	29.15	12.64	29.56	11.86	−0.291	0.771

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Table 3 shows the data on team performance during 2014 and 2019 FIBA Basketball World Cups in terms of match outcome. The comparison showed that significant factors in the difference between victory and defeat in 2014 were the number of points in all four quarters (p < 0.01), number of successful 2-points (p < 0.01), 2-point % (p < 0.01), number of successful 3-points (p < 0.01), 3-point % (p < 0.01), number of successful free throws (p < 0.01), defensive rebounds (p < 0.01), total rebounds (p < 0.01), assists (p < 0.01), number of fouls (p = 0.011), errors (p = 0.017), thefts (p = 0.008), number of blocks (p = 0.030), and points from opponent mistake (p < 0.01), from fast break (p < 0.01), from second chance (p < 0.0), from inside (p < 0.01), and from the bench (p < 0.01).

The comparison revealed that significant factors differentiating between victory and defeat in 2019 were the number of points in all four quarters (p < 0.01), number of successful 2-points (p < 0.01), 2-point % (p < 0.01), number of successful 3-points (p < 0.01), 3-point % (p < 0.01), number of successful free throws (p = 0.018), defensive rebounds (p < 0.01), total rebounds (p < 0.01), assists (p < 0.01), number of fouls (p = 0.01), turnovers (p < 0.01), steals (p < 0.01), number of blocks (p < 0.01), and points from opponent mistake (p < 0.01), from fast break (p < 0.01), from second chance (p = 0.041), from inside (p < 0.01), and from the bench (p < 0.01). The performance indicators that affected victory or defeat appear to be approximately the same for both World Cups. During the 2014 competition, the determinants that played a decisive role in matches that ended in victory were points in all 4 quarters. Shooting is the most basic attacking skill in the game. In matches that led to victory, 2-point shot success was 22.68 compared to matches that ended in defeat, where the success was 18.25. In this case, it is clear that it is the shot success, rather than the number of shots attempted, that has an impact. The shooting quality of 2-point shots is decisive for the final outcome of a match because, as observed from the research findings, the teams that had a winning result, had the success rate of 55% vs. the losing teams that had the success rate of 47%. The correlation between successful shoots from behind the three-point line has an impact on the final result. The teams that were led to success, scored 1.67 3-point shots more per game than the teams that lost (8.37 vs. 6.7). The quality of attacking systems and good finishing of shots led the teams that won to an additional 8% success rate in 3-point shots. In games won, the percentage rate was 39%, whereas in games lost, it was 31%. The significance of the parameter of free throws, in terms of its impact on the final score, was highlighted by the research study. The teams that won, had 2.4 more shots (14.3 in victory vs. 11.9 in defeat). Defensive rebounds were another key indicator of the differentiation between the team that wins and the one that loses. In matches that ended in victory, there were 5 more defensive rebounds, which gave more possession to the teams that won (27.4 vs. 22.). Assists, which is the result of good ball movement, have considerably affect the final outcome of the game. A total of 4.82 more assists was counted in games that ended in victory. The significance of the variable of turnovers was indicated by research because it was made clear that the teams that ended up losing made 15.3 turnovers, compared to the winning teams, which made less turnovers, i.e., 13.5. The defensive pressure applied by opponent players leads to turnovers made by the attacking players. The performance indicator of steals, as a result of personal pressing defense, appears to play a decisive role on the outcome of the game. Games that ended in victory had 7.5 steals vs. 6.1 of games that ended in defeat. In addition, the key defensive skill of block appeared to be stronger in games with a winning result (i.e., 3.1) compared to those games that ended in defeat (i.e., 2.3). Points from opponent mistakes were the key indicator of differentiation between the winning and losing team. Defensive pressure resulted in 5.61 more points per game for the team (18.1 vs. 12.49). Another key performance indicator was points from fast breaks. The teams that won scored 4.86 more points from fast breaks per game. In games that ended in victory, there were 11.8 steals, vs. 6.9 in games that ended in defeat. Second chance points emerged as a key variable that determined the result. The teams that won, scored 11.7 points vs. 9.2 in games that ended in defeat. More possessions offer the chance for more attacks. Points from inside were another key efficiency indicator in victory (37.6 vs. 28.5). The tactic of teams, according to which the ball is passed into the paint, leads to performance optimization. Finally, the key performance indicator was points from the bench, where 6.9 more points were scored per game by the winning teams (32.6 vs. 25.7).

Table 3. Comparison of team performance during 2014 and 2019 FIBA Basketball World Cups in terms of match outcome

	2014 (n = 76)					2019 (n = 92)				
	Win		Lose			Win		Lose		
	M	SD	M	SD	p	M	SD	M	SD	p
First quarter	20.5	6.3	17.2	4.3	<0.01	21.0	5.3	17.0	4.8	<0.01
Second quarter	20.8	4.7	15.5	5.2	<0.01	20.7	5.4	16.7	4.7	<0.01
Third quarter	21.6	5.9	17.1	5.1	<0.01	21.7	4.8	17.0	5.0	<0.01
Fourth quarter	21.5	5.5	18.4	5.8	<0.01	22.3	4.8	18.9	4.9	<0.01

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Field Goal	62.7	7.6	61.5	7.0	0.294	65.0	7.4	63.8	7.2	0.340
2-point success	22.7	6.0	18.3	3.3	<0.01	21.8	4.7	18.4	4.4	<0.01
2-point attempts	40.9	8.3	39.8	6.8	0.367	40.1	6.0	39.9	7.0	0.892
2-point %	55%	9%	47%	10%	<0.01	55%	10%	46%	9%	<0.01
3-point success	8.4	2.5	6.7	3.0	<0.01	9.28	3.33	6.86	2.65	<0.01
3-point attempts	21.8	5.1	21.7	5.9	0.883	24.9	6.3	23.6	6.3	0.222
3-point %	39%	10%	31%	10%	<0.01	37%	10%	29%	9%	<0.01
Free throw success	14.3	5.8	11.9	5.9	<0.01	15.3	7.2	12.8	5.6	0.018
Free throw attempts	20.1	7.8	16.6	7.0	0.012	20.1	8.1	17.5	6.6	0.031
Free throw %	71%	13%	73%	15%	0.525	74.0%	13%	72%	13%	0.304
Offensive rebound	11.2	4.2	9.9	3.9	0.054	10.9	3.9	10.7	4.1	0.701
Defensive rebound	27.5	5.0	22.5	4.4	<0.01	28.8	4.6	24.1	5.2	<0.01
Total rebound	38.6	6.5	32.4	5.8	<0.01	39.7	5.9	34.8	7.0	<0.01
Assists	17.1	5.0	12.3	3.6	<0.01	21.4	5.3	14.9	3.7	<0.01
Personal Fouls	19.9	4.2	21.5	3.7	0.011	18.9	4.4	20.8	4.6	0.01
Turnover	13.5	3.6	15.3	5.3	0.017	12.5	2.8	14.6	4.0	<0.01
Steals	7.5	3.8	6.1	2.6	0.008	8.0	3.0	6.6	2.3	<0.01
Blocks	3.2	2.4	2.4	2.0	0.030	3.5	2.1	2.2	1.7	<0.01
Points from opponent mistakes	18.2	9.4	12.5	4.7	<0.01	17.8	6.8	12.4	5.2	<0.01
Points from fast break	11.8	8.7	6.9	4.1	<0.01	11.1	5.0	8.4	5.8	<0.01
Points from second chance	11.7	5.0	9.2	4.4	<0.01	10.3	5.0	8.7	4.4	0.041
Points from inside	37.7	11.0	28.5	8.1	<0.01	37.8	9.7	30.0	8.3	<0.01
Points from the bench	32.6	13.1	25.7	11.3	<0.01	32.8	12.6	26.4	10.2	<0.01

During the 2019 Men's World Cup, the major factors that determined win over loss were points in all 4 quarters. The 2-point field goal success was 21.8 in matches that ended in victory vs. 18.42 that ended in defeat. Regarding the 2-point field goal %, it was 55% in victory vs. 46% in defeat, which shows that better choices during attack improve the success rate. The teams that showed a winning result, scored 2.4 more 3-point shots per match (9.3 vs. 6.9). The teams that won, showed a 37% success rate in 3-point field goal % vs. 29% in defeat. The teams that lost, had a lower free throw success (12.8), compared to the teams that won (15.3), which was possibly justified by the higher concentration while shooting the free throw. The number of defensive rebounds affects the final result because games that ended in victory showed more rebounds (i.e., 28.8) compared to games that led to defeat (4.7 more per game). This finding is confirmed by the fact that rebounds offer a chance for more possessions during attack. The development of cooperation favors more assists, which positively affects efficiency. The teams that won made 21.4 more assists compared to the teams that lost, which made 14.9. The teams that had more turnovers (i.e., 14.6), which resulted from mistakes or rule violations, were led to loss in the final outcome of the game, compared to the teams that won, because they made fewer turnovers (i.e., 12.5). Attacking defense resulted in 1.4 more more for the teams that won (i.e., 8) vs. 6.6 when the teams lost. The defensive skill of block also affected the match result, which was positive (with 3.5 blocks) vs. negative (with 2.2 blocks). Points from opponent mistakes, which is the result of good defense, affected the final outcome of the match. A total of 17.8 points were scored in matches that ended in victory vs. 12.4 in matches that ended in defeat. The dominance of offensive vs. defensive players during attack led to more points from fast break. The teams that won scored 11.1 points vs. 8.4. A positive correlation was observed between second chance points and the result, which showed that a match led to victory when 10.32 points were scored, and to defeat, when 8.7 points were scored. The points that were scored in the paint, as a result of the tactics of teams, affected the final

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result of the match. It was shown that, in victories, 37.8 points were scored in the paint vs. 30.3 in defeats. Finally, the teams that scored 32.8 points from the bench achieved a victory vs. the teams that scored 26.4 and suffered a defeat. This resulted from the fact that the teams took advantage of the greater number of players during the game.

Table 4 shows data on team performance during 2014 FIBA Basketball World Cup regarding the stage that teams have reached. The comparison showed that significant factors in differentiating between different stages of the competition were the number of points in the first ($p = 0.019$), third ($p = 0.040$), and fourth quarter ($p < 0.01$), the number of successful 2-points ($p < 0.01$), 2-point % ($p < 0.01$), defense rebounds ($p = 0.044$), assists ($p = 0.016$) and points from inside ($p < 0.01$). The differences in performance indicators determined qualification to the next rounds up to the Final Four. By analyzing the results, it was observed that during the 2014 World Cup, the teams that qualified to the next round and reached the Final Four scored the most points on average (85.3 points). Moreover, they scored more points in the 2nd quarter (20.2 in average) and 3rd quarter (23.1). The 2-point field goal % was the key determinant of successful performance, and those teams that qualified, had 56% in semifinals, 55% in quarterfinals, and 50% in the 2nd round compared to the teams that were disqualified during the first round, which had 45%. The correct choice of shots is extremely important during attack to allow the teams to reach quarterfinals and semifinals. Furthermore, 2-point field goals made is an interesting factor, and those teams that reached the Final Four had 23.6 2-point shots, 21.6 in quarterfinals, and 19.8 2-point shots in the 2nd round, whereas those that were disqualified in the first round had 17.3. Therefore, the number of attempts of 2-point shots is not important; however, the fact that these shots are successful is important. Defensive rebounds played a decisive role, and the teams that were qualified, had 22.1 in the 1st round, 25.8 in the 2nd round, 26.2 in quarterfinals, and 26.1 in semifinals, which indicates that as teams progress through the rounds of the tournaments, they need more rebounds that will offer them more possessions during attack. Better ball movement and passing to an open player also played a decisive role on qualification. Assists, for the teams that were qualified, were 12.1 in the 1st round, 14.87 in the 2nd round, 15.6 in quarterfinals, and 16.5 in semifinals; the more difficult were the games, the more assists were passed to the teammate for successful attack. Finally, those teams that qualified to the next rounds had more points in the paint. The teams had 26.2 points in the 1st round, 31.1 in the 2nd round, 36.1 in quarterfinals, and 40.0 in semifinals owing to the attacking tactics of the teams that played mostly with tall players or attacking systems that ended in inside game.

Table 4. Comparison of team performance during the 2014 FIBA Basketball World Cup in terms of the stage that teams reached

	Stage								p
	First round		Second round		Quarterfinal		Semifinal		
	M	SD	M	SD	M	SD	M	SD	
Final Points	69.6	6.1	74.5	6.3	78.7	5.4	85.3	13.0	0.019
First quarter score	16.6	3.4	19.1	2.7	19.6	4.9	20.4	2.9	0.244
Second quarter score	16.0	2.3	17.1	2.5	19.8	1.9	20.2	3.8	0.040
Third quarter score	17.0	1.7	18.5	2.0	19.3	1.3	23.1	4.2	<0.01
Fourth quarter score	19.2	1.9	19.4	2.1	19.6	1.7	21.6	2.9	0.305
Field Goal	62.3	4.2	61.7	1.7	61.3	1.6	63.4	9.0	0.903
2-point success	17.3	2.1	19.8	1.8	21.6	2.4	23.6	5.4	<0.01
2-point attempts	38.9	3.7	40.4	3.0	39.3	3.2	42.5	8.7	0.608
3-point success	7.6	1.3	7.5	1.7	7.3	1.3	7.7	0.7	0.975

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3-point attempts	23.5	2.0	21.2	4.2	21.9	3.5	20.8	1.3	0.436
Free throw success	12.2	2.9	12.3	3.2	13.6	2.2	14.9	1.4	0.374
Free throw attempts	16.4	3.2	17.4	3.8	19.5	2.4	20.7	1.3	0.134
Offensive rebound	10.3	2.8	10.9	2.4	10.1	0.9	10.6	3.1	0.952
Defensive rebound	22.1	3.1	25.8	2.6	26.2	3.1	26.1	2.8	0.044
Total rebound	32.4	5.1	36.6	2.3	36.3	2.2	36.7	5.5	0.157
Assist	12.1	1.9	14.9	2.2	15.6	1.8	16.5	3.3	0.016
Personal Fouls	21.2	2.8	21.0	1.4	20.1	2.4	20.4	1.5	0.793
Turnover	15.7	1.8	15.1	3.0	12.8	2.3	13.4	1.0	0.159
Steals	7.0	1.2	6.1	1.3	7.2	1.0	6.9	3.6	0.721
Blocks	2.2	1.8	2.5	1.3	3.4	1.7	3.2	1.7	0.554
Points from opponent mistake	14.1	1.5	12.9	3.0	17.5	2.4	17.8	8.8	0.140
Points from fast break	7.4	2.8	8.3	1.7	10.5	3.7	11.8	10.1	0.415
Points from second chance	10.3	3.2	9.8	1.4	9.7	0.3	11.9	3.6	0.511
Points from inside	26.2	6.4	31.1	5.0	36.1	2.9	40.0	9.1	<0.01
Points from the bench	27.2	6.1	26.2	5.8	30.0	4.8	34.3	6.2	0.150
2-point %	45%	5%	50%	3%	55%	5%	56%	3%	0.001
3-point %	32%	4%	35%	6%	34%	3%	37%	2%	0.291
Free throw %	72%	9%	70%	5%	69%	6%	72%	3%	0.809

Table 5 shows the findings regarding the team performance during the 2019 FIBA Basketball World Cup regarding the stage that teams reached. The comparison revealed that the most important factors that differentiated between different stages of the competition were the number of points in the first quarter (p = 0.026), 2-point % (p < 0.01), number of successful free throws (p = 0.033), free throws % (p < 0.01), assists (p < 0.01), and points from inside (p < 0.01). From the analysis of results, it was observed that during the 2019 World Cup, the teams that qualified and reached the Final Four on average scored the most points (85 points). The teams that had better 2-point shot field goal %, owing to a better choice during attack, reach quarterfinals and semifinals. There is an increasing trend in the field goal % as the teams qualify to more difficult matches. The 2-point field goal % for those teams that qualified to semifinals was 55%, 56% for quarterfinals, 50% for the 2nd round, and 48% for the 1st round. In addition, there were more assists from round to round, i.e., 15.8 in the 1st round, 18 in the 2nd round, 20.7 in quarterfinals, and 20.7 in semifinals. Those teams that qualified to the next round scored more points from opponent turnovers owing to the pressing defense that was applied by the

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opposing team. The teams score more points from opponent turnovers as they qualify to more difficult rounds in the tournament. Thus, 12.6 points were scored in the 1st round, 15.3 in the 2nd round, 16.2 in quarterfinals, and 18 in semifinals. The teams that were disqualified in the first round scored fewer points from the bench. The teams that qualified scored on average 25 points from the bench in the 1st round, 33.2 in the 2nd round, 33.5 in quarterfinals, and 29.9 in semifinals.

Table 5. Comparison of team performance during 2019 FIBA Basketball World Cup in terms of the stage that teams reached

| | Stage | | | | | | | | p |
| | First round | | Second round | | Quarterfinal | | Semifinal | | |
	M	SD	M	SD	M	SD	M	SD	
Final Points	73.1	9.5	77.9	7.4	84.6	7.9	85.0	1.2	0.026
First quarter score	18.0	3.2	19.3	2.3	19.9	4.0	20.0	1.4	0.455
Second quarter score	17.2	3.8	18.5	2.2	21.3	3.5	20.2	1.1	0.111
Third quarter score	18.0	3.7	18.4	2.5	20.8	3.1	21.7	0.3	0.132
Fourth quarter score	19.2	3.7	21.4	1.9	21.2	3.1	21.8	0.8	0.261
Field Goal	64.8	4.1	64.5	3.6	63.3	6.3	64.2	2.4	0.939
2-point success	19.0	1.6	20.8	2.9	21.6	2.2	20.7	0.8	0.051
2-point attempts	40.0	2.1	41.9	5.5	39.0	4.6	38.2	1.1	0.309
3-point success	7.7	1.9	7.1	1.9	8.7	1.2	9.3	0.4	0.184
3-point attempts	24.4	4.1	22.5	3.2	24.4	4.5	26.0	3.1	0.545
Free throw success	12.0	3.1	15.0	2.5	15.3	4.6	16.2	1.7	0.033
Free throw attempts	17.2	4.2	19.7	3.5	20.0	5.0	20.6	3.0	0.269
Offensive rebound	11.4	2.2	10.4	1.6	10.4	1.7	10.0	1.2	0.472
Defensive rebound	24.7	3.6	26.7	1.7	28.6	2.3	27.8	1.6	0.071
Total rebound	36.1	4.0	37.1	1.6	39.0	3.9	37.8	2.7	0.473
Assist	15.8	3.3	18.0	2.0	20.7	3.5	20.7	2.5	<0.01
Personal fouls	19.9	3.3	20.7	1.8	18.8	1.2	19.8	1.3	0.743
Turnover	14.2	2.1	13.0	1.8	13.7	2.2	13.2	1.9	0.530
Steals	7.1	1.3	7.7	0.7	6.9	1.9	7.5	2.4	0.781
Blocks	2.5	1.3	2.8	0.6	3.3	0.6	3.2	0.8	0.450
Points from opponent mistake	12.6	3.0	15.3	2.8	16.2	3.7	18.0	4.5	0.018
Points from fast break	9.1	3.6	10.5	3.9	11.2	4.4	9.3	2.8	0.687
Points from second chance	9.6	2.3	9.3	1.7	9.0	2.1	9.8	0.9	0.925
Points from inside	31.3	5.7	34.5	5.6	37.0	5.3	35.9	2.6	0.163
Points from the bench	25.0	7.8	33.2	6.4	33.5	9.0	29.9	4.1	0.051
2-point %	48%	4%	50%	5%	56%	6%	55%	3%	<0.01
3-point %	31%	6%	31%	4%	37%	5%	36%	5%	0.202
Free throw %	68%	6%	77%	6%	74%	5%	78%	4%	<0.01

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Figures 1 and 2 summarize the key factors leading to the Final Four during 2014 and 2019 FIBA Basketball World Cups according to the average statistics of teams in each stage.
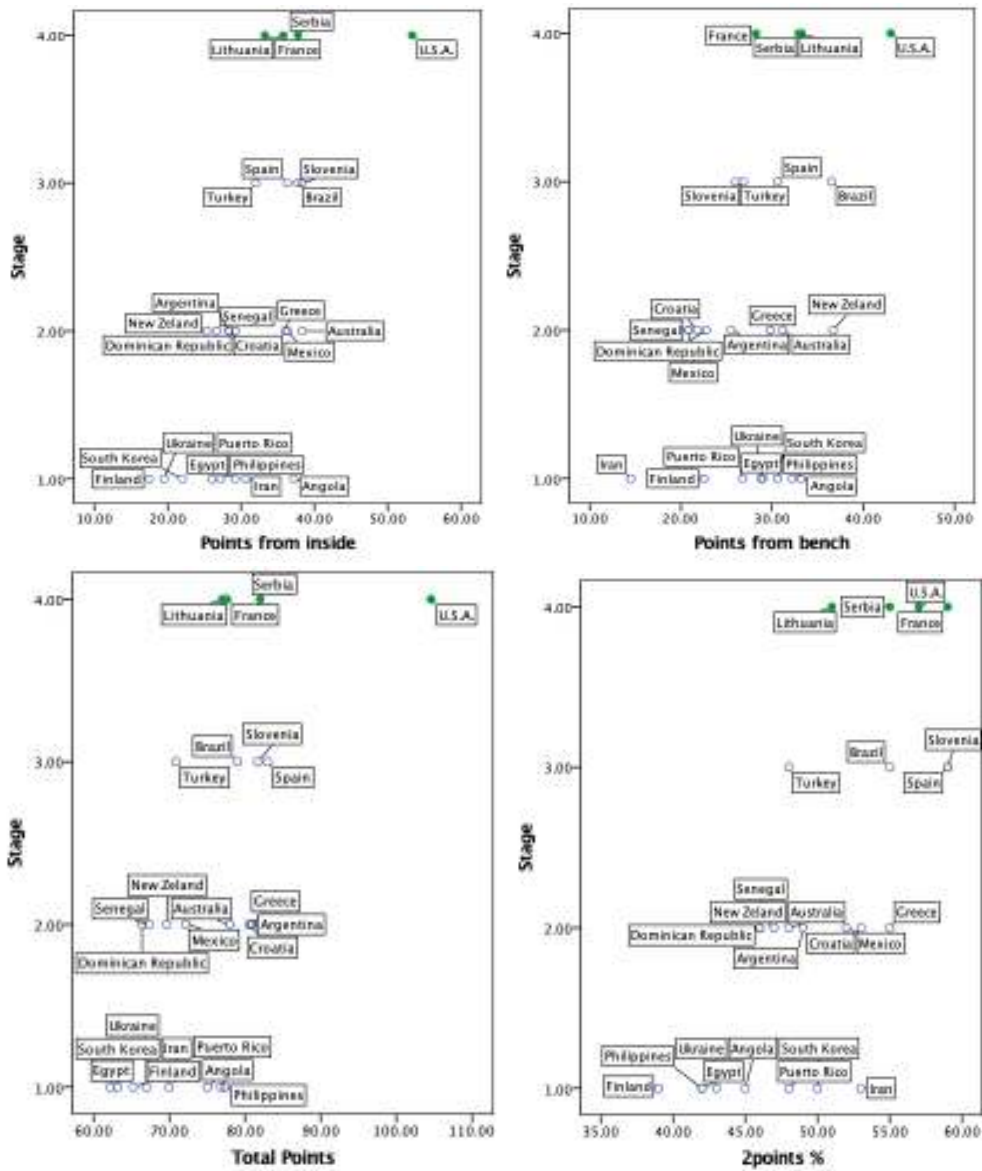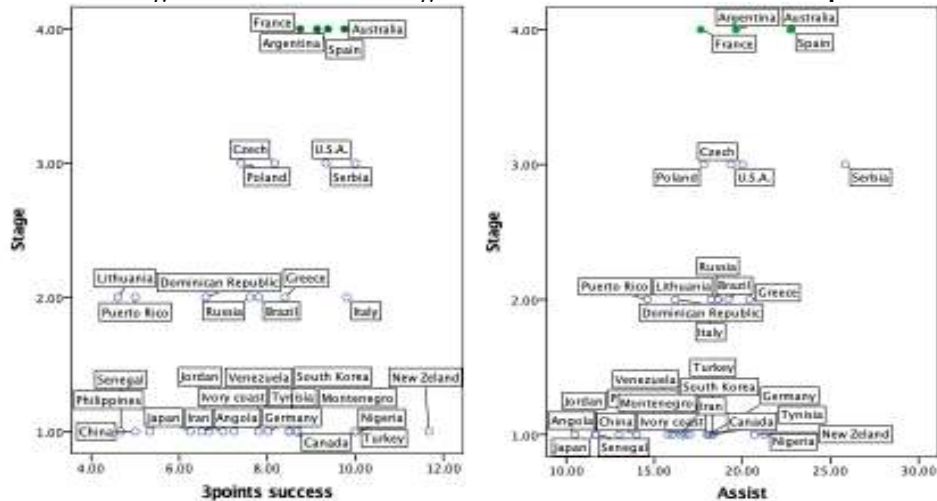

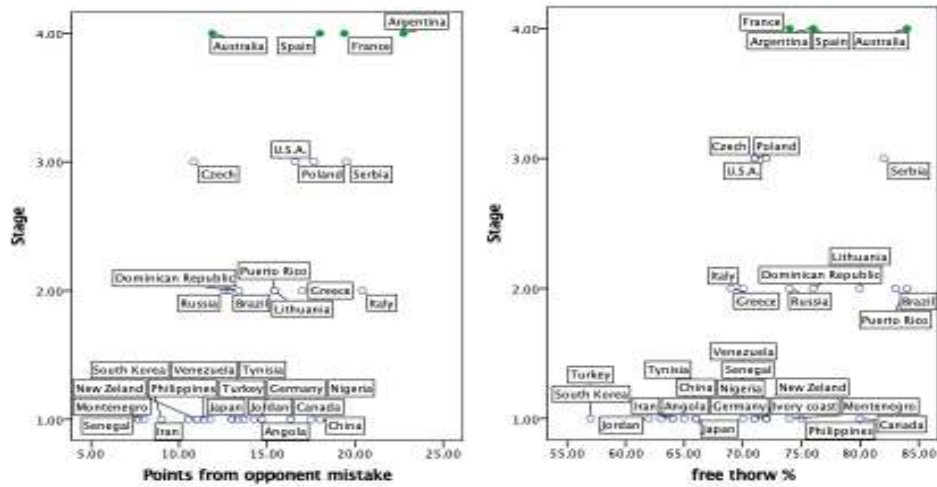**Figure 1. Factors leading to the Final Four during the 2014 FIBA Basketball World Cup**

Figure 2. Factors leading to the Final Four during the 2019 FIBA Basketball World Cup

Discussion

The impact of statistical indicators and their use in the tactics of the teams to maximize performance has been the subject of research studies in recent years (Leicht et al., 2017; Milanović et al., 2016; Sampaio et al., 2010; Ibanez et al., 2008). In this study, significant differences, which exist among the parameters that affect victory or defeat, were examined as well as qualification to next rounds up to the Final Four. The analysis was performed for 2014 and 2019 Men's World Cups.

U.S.A., the champion team of the 2014 World Cup, scored more than 50 points from the paint; whereas the other three finalists (Serbia, France, and Lithuania) scored between 30–40 points. This observation agrees with Garcia et al., 2013; Ibáñez, Garcia, Feu, Lorenzo, & Sampaio, 2009; Gomez et al., 2008. For the same teams, 25–45 points were scored by players coming from the bench. The 2-point field goal % for the four teams that contended for the medals, was more than 50%, and the significance of this parameter regarding its impact on efficiency was highlighted in the surveys of Leicht, Gómez, & Woods, 2017b ; Garcia, Ibanez, De Santos, Leite, & Sampaio, 2013; Sampaio, Drinkwater, & Leite, 2010; Jukić, Milanović, Vuleta, & Bračić, 2000. Field-goal shooting is one of the most fundamental basketball skills. Thus, it is not surprising that such results were obtained in this study, i.e., the winning teams outperformed the losing teams in this offensive aspect (Gomez et al., 2006). During the 2019 World Cup, the four teams of the final four had 8–10 more successful 3-point shots than the teams that were disqualified (Milanovic et al., 2016; Gomez, Gasperi, & Lupo, 2016). The teams that won medals (i.e., Spain, Argentina, and France) and the 4th team (i.e., Australia) had 15–25 more assists than the teams that did not qualify to the final round, and the same variable has been observed in other studies on men's basketball (Ibanez et al., 2008). The free throws field goal % was between 73% and 85% for the teams that played knockout matches for medals, and these data agree with those of Csataljay et al., 2009; Reano; Sampaio & Janeira, 2003; Tavares & Gomes, 2003. In addition, the 2-point shot field goal % was greater than 50% and up to 65% for the same teams. The final score on average ranged between 80 and 90 points per match.

Finally, the four teams that reached the final round scored 10–25 points from opponent turnovers. Offensive turnovers typically originate from poor ball passing or receiving, travelling or double dribble, and violation of rules (stepping out of bounds, shot-clock violation, illegal screen, palming, three-second, or five-second violation). The significance of this variable has been also indicated in other studies (Lorenzo et al., 2010) (Fig. 3).
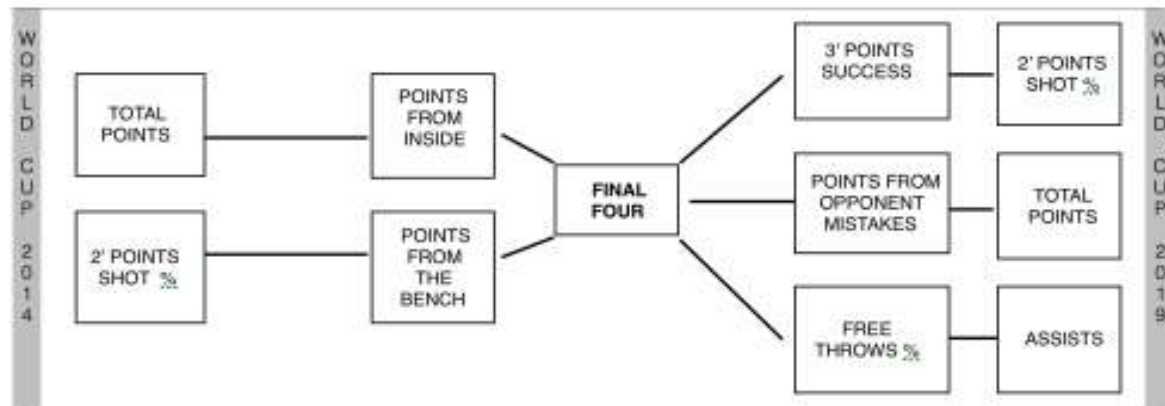

Figure 3. Ranking of selected playing variables to maximize success during the World Cups

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Conclusions

In conclusion, by analyzing 2014 and 2019 World Cups, the progress in the game was illustrated. In 2014, the national teams played more in the paint. Owing to this playing style that mostly used tall players, the attacking movements ended in the paint, which resulted in more scored points in the paint. Thus, the total number of points (mostly 2-point shot field goal %) emerges as a better performance indicator because it is the most basic skill in basketball. However, during the 2019 World Cup, the play seemed to move from the inside to the perimeter area, with players attempting 3-point field goals and scoring an extra point for their teams. In addition, the national teams seemed to pay more attention to successful free throws. Furthermore, during attacks, an extra pass that could be an assist offered better chances for scoring. Finally, defensive pressure on opponents increased because the teams scored more points owing to opponent turnovers.

Conflicts of interest

The author declares no conflict of interest

References

Bliss, D. (1998). Game management. *In Instant Review Basketball Notebook*, Champain IL: Sagamore Publishing, Inc.

Çene, E. (2018). What is the difference between a winning and a losing team: insights from Euroleague basketball.*International Journal of Performance Analysis in Sport*, **18**(1), 55–68.

Csataljay, G., O'Donoghue, P., Hughes, M., & Dancs, H. (2009). Performance indicators that distinguish winning and losing teams in basketball. *International Journal of Performance Analysis in Sport*, **9**(1), 60–66.

De Saá, Y., Martín, J. M., Sarmiento, S., Rodriguez, D., Aguilar-López, N., & García- Manso, J. M. (2013). Basketball scoring in NBA games: an example of complexity. Journal of Systems Science and Complexity, **26**(1), 94–103.

Drust, B. (2010). Performance analysis research: Meeting the challenge.

Garcia, J., Ibanez, S. J., Gomez, M. A., & Sampaio, J. (2014). Basketball Game-related statistics discriminating ACB league teams according to game location, game outcome and final score differences. *International Journal of Performance Analysis in Sport,* **14**(2), 443–452.

Gomez, M. A., Battaglia, O., Lorenzo, A., Lorenzo, J., Jimenez, S., & Sampaio, J. (2015). Effectiveness during ball screens in elite basketball games. *Journal of Sports Sciences,* **33**(17), 1844–1852.

Gomez, M. A., Gasperi, L., & Lupo, C. (2016, August). Performance analysis of game dynamics during the 4th game quarter of NBA close games. *International Journal of Performance Analysis in Sport,* **16**, 249–263.

Gómez, M. Á., Lorenzo A., Ortega, E, Sampaio, J., & Ibáñez, S. J. (2009). Game related statistics discriminating between starters and nonstarters players in Women's National Basketball Association League (WNBA). Journal of Sports Science and Medicine, **8**(2), 278-283.

Gómez, MA., Lorenzo, A., Sampaio, J., Ibáñez, SJ., & Ortega, E. (2008). Game-related statistics that discriminated winning and losing teams from the Spanish men᾿s professional basketball teams. *Collegium Antropol*, **32**(2), 315–319

Hughes, M. D., & Bartlett, R. M. (2002). The use of performance indicators in performance analysis. *Journal of sports sciences*, **20**(10), 739–754.

Ibáñez, S. J., Sampaio, J., Sáenz-López, P., Giménez, J., & Janeira, M. A. (2003). Game statistics discriminating the final outcome of junior world basketball championship matches (Portugal 1999). *Journal of Human Movement Studies*, **45**(1), 1–20.

Ibanez, S., Sampaio, J., Feu, S., Lorenzo, A., Gomez, M., & Ortega, E. (2008). Basketball game-related statistics that discriminate between teams' season-long success. *European Journal of Sport Science,* **8**(6), 369–372.

Ibanez, S., Sampaio, J., Saenz-Lopez, P., Gimenez, J., & Janeira, M. (2003). Game statistics discriminating the final outcome of junior world basketball championship matches (Portugal 1999). *Journal of Human Movement Studies, 45*(1), 1–19.

Knight, B. (1974). Instant Replay Notebook, *Basketball coaches Clinics*, 56.

Leicht, A. S., Gomez, M. A., & Woods, C. T. (2017, August). Explaining match outcome during the men's basketball tournament at the olympic games. *Journal of Sport Science and Medicine,* **16**, 468–473.

lford, S (1998). Defensive drills and concepts. *In Instant Review Basketball Notebook*, Champain, IL: Sagamore Publising, Inc.

Lorenzo, A., Gómez, MA., Ortega, E., Ibáñez, SJ., & Sampaio, J. (2010) Game related statistics which discriminate betweenwinning and losing under-16 male basketball games. *J Sport Sci Med*, **9**, 664–668

Milanovic, D., Stefan, L., Sporis, G., Vuleta, D., & Selmanovic, A. (2016). Effects of situational efficiency indicators on final outcome among male basketball teams on the Olympic games in London 2012. *Acta Kin,* **10**(1), 78–84.

Oliver, D. (2004). Basketball on paper: Rules and tools for performance analysis. Washington, DC: Brassey᾿s, Inc.

1982---

JPES ®   www.efsupit.ro

Sampaio, J., & Janeira, M. (2003, April). Statistical analyses of basketball team performance: Understanding teams' wins and losses according to a different index of ball possessions. *International Journal of Performance Analysis in Sport,* **3**, 40–49.

Sampaio, J., Drinkwater, E. J., & Leite, N. M. (2010). Effects of season period, team quality, and playing time on basketball players' game-related statistics. *European Journal of Sport Science,* **10**(2), 141–149.

Simović, S., Komić, J., Guzina, B., Pajić, Z., & Vojvodić, M. (2019). INFLUENCE OF GAME-RELATED STATISTICAL ELEMENTS ON FINAL RESULT AT FIBA EUROBASKET WOMEN 2017. *Facta Universitatis, Series: Physical Education and Sport*, **16**(2), 709–723.

Trninic, S., Dizdar, D., & Luksic, E. (2002). Differences between winning and defeated top quality basketball teams in final tournaments of European club championship. *Collegium Antropologicum,* **26**(2), 521–531.

Trninić, S., Milanović, D., & Dizdar, D. (1997). What is the difference between winners and losers in basketball?.*Leistungssport*, **27**(2), 29–34.

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