THE STRATEGIC ROLE OF THE 3-POINT SHOT IN ELITE BASKETBALL

Uros Zivkovic, Radivoj Mandic, Sasa Jakovljevic
University of Belgrade – Faculty of Sport and Physical Education

ABSTRACT
The 3-point shot has become an increasingly critical component of modern basketball across all levels of competition. This study aims to (1) analyze the distribution and efficiency of 3-point shots based on court location and method of execution, and (2) to examine the extent to which 3-point shooting performance influences game outcomes. The research sample consists of 28 elimination-phase games from the 2022 European Championship and the 2023 FIBA World Cup. Data were obtained through expert video analysis and official box score statistics. Results indicate that the highest frequency of 3-point attempts originates from the left and right wings (18.8 and 17.5 attempts per game, respectively), followed by the top of the key (13.7), with the fewest attempts from the corners (10.04). In terms of efficiency, the left and right wings exhibit the highest shooting percentages (40.1% and 38.7%, respectively). Regarding shooting method, the most prevalent is the 3-point shot taken in motion (27.8 attempts per game), followed by off-the-dribble (19.6), and spot-up attempts (12.2). The most efficient shooting method is the spot-up shot following an outlet pass (43.8%), followed by shots taken in motion on the perimeter (40.2%). An independent samples t-test revealed that winning teams attempted a greater number of 3-point shots and exhibited higher shooting efficiency, particularly from the right wing. Discriminant function analysis was employed to assess the impact of shot efficiency on game outcomes. The analysis yielded a statistically significant discriminant function (p = 0.029), with a canonical correlation of 0.398, Wilks' Lambda of 0.842, and a classification accuracy of 69.6%. Standardized coefficients and explained variance indicate that 3-point shooting efficiency is the most influential variable in determining game outcomes. These findings underscore the critical role of 3-point shooting efficiency—particularly from specific court locations and execution methods—in determining the outcome of elite-level basketball games

ORCID
Uros, Zivkovic
https://orcid.org/0009-0003-0325-0224
Radivoj, Mandic
https://orcid.org/0000-0001-9545-3712
Sasa, Jakovljevic
https://orcid.org/0000-0003-1823-4377
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INTRODUCTION

From its inception to the present day, basketball has constantly changed, becoming more attractive, faster, and with more athletic players. Regardless of this development, one thing has remained unchanged, which is that it is necessary to score more points than the opponent, that is, to get the ball through a horizontal hoop that is at a height of 3.05m. Whether it's a free throw, jump shot, lay-up, or slam dunk, no skill is more crucial in basketball than shooting.

There is no doubt that rule changes bring more dynamics and appeal to the game. The introduction of the three-point line in the NBA (National Basketball Association) in 1979 and FIBA (International Federation of Basketball) in 1984 made it possible to score three points for a successful shot outside that line, in addition to the previous one and two points. No other sport in the world has this. Since its introduction, the three-point shot has permanently increased its importance. When observing the World Championships from 1986 to 2010, it can be seen that the number of 3-point shots has been gradually increasing in each subsequent competition (Simovic et al., 2012). In the NBA, the number of attempts and percentage of 3-point shots, regardless of playing position, were on the rise until 2021 (Wang & Zheng, 2022). The last rule change within FIBA (2010-11 season) that moved the 3-point line further from the basket, negatively affected the frequency of 3-point shots and changed the distribution of field shots (Strumbelj et al., 2013), but only for that season (Mandic et al., 2019). The 3-point shot has become an increasingly critical component of modern basketball across all levels of competition. It is used now more than ever. Simply taken, although 100 two-point attempts typically produce just 79 points on average, 100 three-point attempts yield a significantly higher return of 105 points (Shea, 2020). Additionally, in today's game, the majority of shots are taken from the rack or beyond the 3-point line (Bozovic et al., 2021).

In addition to its importance, the three-point shot has a significant impact on the outcome of games. Winning teams made significantly more successful free throws, 2-point shots, and 3-point shots compared to losing teams (Csataljay et al., 2012, 2009). The 3-point shot has a significant impact on success in both tied games in the Spanish ACB League (Garcia et al., 2014) and tied games in the Euroleague (Çene, 2018). The 3-point shot is also strongly associated with winning the 2019 World Cup (Stavropoulos et al., 2021). In 10 consecutive seasons of the Spanish ACB League, Puente et al. (2015) showed that, in addition to 2-point shots, assists, and points received, 3-point shooting is a crucial factor in differentiating winning and losing teams. In addition, analyzing data from the NBA from the 2009/10 to 2018/19 seasons, Gou and Zhang (2022) concluded that an "outside game" with a higher number of 3-point shots is associated with stronger teams in the league, while weaker teams used the 2-point shot more.

Recently, there has been an increased interest among researchers in analyzing the three-point shot. Namely, its kinetics and kinematics are analyzed (Bourdas, 2024; Cabarkapa et al, 2022; Vencúrik et al, 2021), as well as the conditions in which it is performed, the distance of the opponent (Csataljay et al., 2013), noise interference (Yang et al., 2024), and gaze behavior (Piras, 2024), which can affect the quality of the shot itself. In this regard, choosing the best solution at the right time testifies to the overall quality of the player (Marmarinos et al., 2016). However, as far as the authors are aware, there is a lack of analysis of the distribution and efficiency of the 3-point shot in relation to the location from which the shot is taken. There is also a lack of research on the execution type of performing the 3-point shot, e.g., whether the shot is performed from a stationary position (stationary catch-and-shoot) or after movement, without or with the use of dribbling. Given the increasingly important role of the 3-point shot in deciding the winner, the results of this research could be used to improve 3-point shooting training methodology to optimize player performance.

Therefore, this study aims to (1) analyze the distribution and efficiency of 3-point shots based on court location and execution type, and (2) to examine the extent to which 3-point shooting performance influences game outcomes. We assume that the wing locations are the most common and also the most effective. We also assume that the stationary catch-and-shoot is the most common and effective way of 3-point execution.

METHODOLOGY

Sample

The research sample comprised data from 28 senior-level international basketball matches, specifically from the knockout stages of EuroBasket 2022 (16 matches) and the FIBA Basketball World Cup 2023 (12 matches). The EuroBasket 2022 matches included those from the round of 16, quarter-finals, semi-finals, final, and third-place game. The World Cup 2023 matches encompassed the quarter-finals, semi-finals, and both the final and third-place games. Notably, several national teams—Germany, Serbia, Italy, Slovenia, and Lithuania—participated in both tournaments and were included in the observed sample.

Procedure and Variables

Data for the present study were obtained through expert video analysis of matches sourced from the official FIBA YouTube channel, employing systematic observational and notational analysis techniques. Supplementary variables were extracted from the official "box score" statistics available on the FIBA website for both analyzed competitions. The variables collected for analysis included:

a) *General Shooting Statistics:* Metrics related to the frequency and efficiency of 1-point (free throws), 2-point, and 3-point field shots, total points scored, and possessions per game.

b) *Shot Execution Type:* Classification of 3-point attempts based on the player's movement prior to the shot. Shots were categorized as either:

- Dribble shots (initiated off the dribble), or
- Catch-and-shoot shots (following a pass), further subdivided into:
  - Stationary catch-and-shoot: where the player was stationary prior to receiving the pass, which could originate either from the perimeter (SP_catch-and-shot) or the inside area (SI_catch-and-shot) (illustrated in Figure 1),
  - Dynamic catch-and-shoot: where the player was in motion prior to receiving the pass and executing the shot, with the movement originating either from the perimeter (DP_catch-and-shot) or from the inside area (DI_catch-and-shot) (see Figure 2).

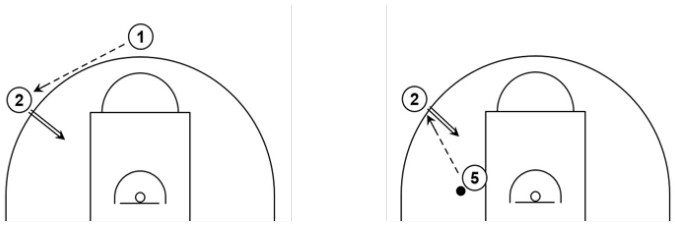

Figure 1. *Schematic representation of a stationary catch-and-shoot: SP_catch-and-shot (a), SI_catch-and-shot (b).*

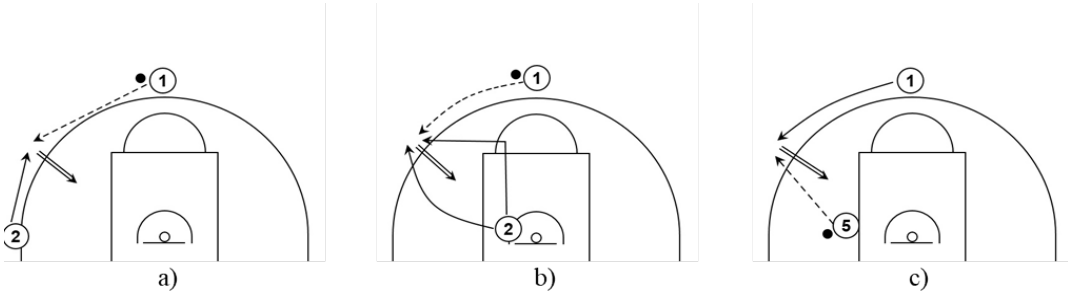

Figure 2. *Schematic representation of a dynamic catch-and-shoot: DP_catch-and-shot (a, b), DI_catch-and-shot (c).*

c) Shooting Location: The court was segmented into five shooting zones: left wing, right wing, central position, left corner, and right corner (Bozovic et al., 2021).

Statistical analysis

Data analysis was conducted using descriptive statistics and independent samples *t*-tests to evaluate differences: (a) between winning and losing teams, and (b) between the two analyzed competitions. Pearson's correlation coefficient (r) was employed to assess the strength and direction of associations between the selected performance variables and teams' win-loss outcomes.

To further determine which shooting-related variables most effectively differentiated between winning and losing teams, a multivariate discriminant analysis (MDA) was performed. Given the relatively small sample size ($n = 28$ games) and the presence of multicollinearity among several variables (defined as $r < .60$), the discriminant analysis was restricted to shooting efficiency metrics for 1-point, 2-point, and 3-point field shots.

All statistical results are presented in tabular form, expressed as nominal counts and percentages where appropriate. The threshold for statistical significance was set a priori at $p < .05$. All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Descriptive statistics, including means and standard deviations, as well as statistically significant differences between independent groups, are presented in Tables 1–4. Each table provides comparative data on performance differences between winning and losing teams, as well as between the two observed competitions: EuroBasket and the FIBA World Cup.

Table 1 presents aggregate data on shooting frequencies—free throws, 2-point field goals, and 3-point field goals—alongside total points scored and possessions per game. While no significant differences were observed between the two competitions for these variables, significant differences were found between winning and losing teams. Specifically, winning teams recorded higher total points scored ($p = .001$), a greater number of 3-point shots made ($p = .027$), and a higher 3-point shooting efficiency ($p = .009$).

Table 1. *Frequency and efficiency of 1-, 2-, and 3-point shots per game, total points scored per game, and possessions per game - Descriptive data and differences between the winning and losing teams and between the EuroBasket and the World Cup*

Shots, Total points scored, Possessions per game	Winning team *(Mean ± SD)*	Losing team *(Mean ± SD)*	Euro Basket *(Mean ± SD)*	World Cup *(Mean ± SD)*
1-point made	16.4 ± 6.32	14.5 ± 5.89	15.3 ± 5.89	15.6 ± 6.54
1-point attempt	20.2 ± 7.16	18.8 ± 6.82	19.3 ± 6.70	19.8 ± 7.43
1-point percentage	80.1 ± 11.4	77.1 ± 10.8	79.2 ± 10.1	77.8 ± 12.5
2-point made	20.9 ± 4.61	18.6 ± 5.11	19.5 ± 4.67	20.1 ± 5.38
2-point attempt	36.0 ± 7.11	34.5 ± 6.80	35.1 ± 6.66	35.5 ± 7.42
2-point percentage	58.1 ± 7.70	53.8 ± 10.0	55.5 ± 9.00	56.5 ± 9.30
3-point made	12.2 ± 3.28*	10.5 ± 2.27*	11.2 ± 2.61	11.5 ± 3.35
3-point attempt	29.9 ± 5.33	30.2 ± 5.09	30.3 ± 5.18	29.7 ± 5.24
3-point percentage	40.8 ± 8.70*	35.1 ± 7.10*	37.4 ± 7.60	38.8 ± 9.50
Total points scored	94.6 ± 9.84*	83.2 ± 13.4*	87.9 ± 10.1	90.2 ± 16.2
Possessions	86.3 ± 7.50	85.3 ± 8.04	85.4 ± 6.88	86.3 ± 8.85

** Statistical significance ($p < .05$).*

Table 2 details 3-point shooting performance by court zone. The highest frequency of 3-point attempts originates from the left and right wing (18.8 and 17.5 attempts per game, respectively), followed by the central position (13.7), with the fewest attempts from the corners (10.04). In terms of efficiency, the left and right wings exhibit the highest shooting percentages (40.1% and 38.7%, respectively). Winning teams demonstrated a significantly higher 3-point shooting percentage from the right wing ($p = .038$). Additionally, when comparing competitions, the World Cup teams outperformed EuroBasket teams in right-corner 3-point shooting across three metrics: made shots ($p = .013$), attempted shots ($p = .032$), and shooting percentage ($p = .006$).

Table 2. *Shooting location of the 3-point shot - Descriptive data and differences between the winning and losing teams, and between the EuroBasket and the World Cup*

3-point shooting location	Winning team *(Mean ± SD)*	Losing team *(Mean ± SD)*	Euro Basket *(Mean ± SD)*	World Cup *(Mean ± SD)*
Central position made	2.36 ± 1.64	2.07 ± 1.09	2.31 ± 1.42	2.08 ± 1.35
Central position attempt	6.39 ± 3.43	7.32 ± 2.37	7.16 ± 3.32	6.46 ± 2.40
Central position percentage	37.3 ± 24.7	28.5 ± 10.8	34.5 ± 20.9	30.8 ± 17.5
Right wing made	3.82 ± 1.96	2.93 ± 1.33	3.41 ± 1.68	3.33 ± 1.81
Right wing attempt	8.86 ± 3.34	8.61 ± 2.44	9.19 ± 3.07	8.13 ± 2.59
Right wing percentage	42.5 ± 14.2*	34.8 ± 13.1*	37.4 ± 14.0	40.3 ± 14.4
Left wing made	4.04 ± 2.03	3.39 ± 1.42	3.94 ± 1.92	3.42 ± 1.53
Left wing attempt	9.75 ± 2.98	9.07 ± 2.45	9.56 ± 2.64	9.21 ± 2.87
Left wing percentage	42.3 ± 18.8	37.9 ± 13.2	41.4 ± 16.9	38.3 ± 15.5
Right corner made	0.64 ± 0.95	0.86 ± 0.80	0.50 ± 0.62*	1.08 ± 1.06*
Right corner attempt	1.82 ± 1.52	2.36 ± 1.47	1.72 ± 1.22*	2.58 ± 1.72*
Right corner percentage	25.6 ± 34.6	33.3 ± 39.2	17.4 ± 29.6*	45.4 ± 39.9*
Left corner made	1.32 ± 1.25	1.21 ± 1.20	1.06 ± 1.13	1.54 ± 1.29
Left corner attempt	3.04 ± 1.93	2.82 ± 1.98	2.66 ± 2.10	3.29 ± 1.68
Left corner percentage	39.6 ± 33.9	35.8 ± 30.6	32.5 ± 31.0	44.6 ± 32.9

** Statistical significance ($p < 0.05$).*

Regarding execution type (Table 3), the most prevalent is the dynamic catch-and-shot (27.8 attempts per game), followed by the dribble shot (19.6) and the stationary catch-and-shot (12.2). The most efficient shooting method is the SI_catch-and-shoot (43.8%), followed by DP_catch-and-shot (40.2%). No statistically significant differences were found between winning and losing teams. However, World Cup teams exhibited a higher efficiency of SI_catch-and-shot ($p = .030$).

Table 3. *Execution type of the 3-point shot - Descriptive data and differences between the winning and losing teams, and between the EuroBasket and the World Cup*

3-point shot execution type	Winning team ***(Mean ± SD)***	**Losing team** ***(Mean ± SD)***	Euro Basket (Mean ± SD)	World Cup (Mean ± SD)
Dribble shot made	3.75 ± 1.82	3.18 ± 1.77	3.63 ± 1.91	3.25 ± 1.65
Dribble shot attempt	10.0 ± 3.71	9.54 ± 4	10.2 ± 3.64	9.25 ± 4.09
Dribble shot percentage	38.1 ± 13.1	31.6 ± 13.4	35.2 ± 10.2	34.5 ± 17.3
SI_catch-and-shot made	1.71 ± 1.49	1.29 ± 1.08	1.28 ± 1.17	1.79 ± 1.44
SI_catch-and-shot attempt	3.07 ± 2.26	3.36 ± 2.26	3.19 ± 2.6	3.25 ± 1.72
SI_catch-and-shot percentage	49.1 ± 38.1	38.4 ± 32.2	34.9 ± 31.9*	55.5 ± 37.0*
SP_catch-and-shot made	0.96 ± 0.88	0.79 ± 0.88	0.94 ± 0.91	0.79 ± 0.83
SP_catch-and-shot attempt	2.86 ± 1.24	2.96 ± 2.43	3.16 ± 2.21	2.58 ± 1.38
SP_catch-and-shot percentage	34.3 ± 32.2	24.1 ± 29.5	28.2 ± 29.8	30.6 ± 33.1
DI_catch-and-shot made	1.39 ± 1.23	1.25 ± 1.18	1.25 ± 1.22	1.42 ± 1.18
DI_catch-and-shot attempt	3.89 ± 1.93	3.82 ± 2.23	3.84 ± 1.87	3.88 ± 2.35
DI_catch-and-shot percentage	33.6 ± 24.7	33.7 ± 29.0	30.1 ± 24.2	38.4 ± 29.6
DP_catch-and-shot made	4.36 ± 2.31	3.96 ± 1.48	4.13 ± 1.91	4.21 ± 2.00
DP_catch-and-shot attempt	10.0 ± 3.48	10.5 ± 2.90	9.91 ± 3.28	10.7 ± 3.06
DP_catch-and-shot percentage	42.5 ± 15.5	37.9 ± 15	40.6 ± 14.0	39.6 ± 17.1

** Statistical significance ($p < .05$).*

To further investigate the relationship between shooting efficiency and game outcome, a discriminant function analysis (MDA) was performed. The resulting function was statistically significant ($p = .029$), with a canonical correlation of 0.398 and Wilks' Lambda (Λ) = 0.842. The model achieved a classification accuracy of 69.6%. Shooting efficiency variables collectively explained 19.4% of the total variance, with 3-point shooting efficiency accounting for 11.8% of that variance (Table 4). Standardized canonical discriminant function coefficients indicated that 3-point shooting percentage was the most influential predictor of winning among the shooting efficiency variables.

Table 4. *Standardized discriminant function coefficients and percentages of total variance for variables related to shooting efficiency between winning and losing teams*

Shooting efficiency variables	Standardized coefficient	Total variance %
3-point shot percentage	0.773	11.8
2-point shot percentage	0.444	5.7
1-point shot percentage	0.300	1.9
Total		19.4

DISCUSSION

This study aimed to explore the distribution and efficiency of 3-point shots in elite international basketball, focusing on shooting location and execution method, while also examining their influence on game outcomes. The findings support the hypothesis that 3-point shooting performance plays a critical role in differentiating winning and losing teams at the highest levels of competition.

The results reinforce the ongoing trend in modern basketball: the increasing reliance on and efficiency of the 3-point shot. Winning teams in this study not only attempted and made more 3-point shots, but also demonstrated significantly higher 3-point shooting percentages compared to losing teams. These findings are consistent with prior literature, which has established the 3-point shot as a key determinant of success across leagues and competitions (Csataljay et al., 2012; Çene, 2018; Gou & Zhang, 2022; Stavropoulos et al., 2021). Furthermore, the discriminant analysis confirmed that 3-point shooting percentage was the most influential efficiency metric in predicting game outcomes, explaining a substantial portion of the variance between winning and losing teams.

As hypothesized, the wing positions (left and right) emerged as the most frequently used and efficient court locations for 3-point attempts. These areas yielded the highest shooting percentages, with the right wing showing a significant difference between winners and losers. This suggests that teams that effectively utilize the wings for 3-point shooting—either through play design or player skill—gain a competitive advantage. Interestingly, although the corners are generally considered high-value zones due to shorter distances, they were underutilized

and less efficient overall, except for the right corner during the World Cup, where a notable increase in accuracy and frequency was observed.

Contrary to the initial assumption, stationary catch-and-shoot attempts were not the most common; dynamic catch-and-shoot dominated in frequency. However, the highest shooting efficiency was recorded for the SI_catch-and-shot, especially during the World Cup. This supports the notion that receiving the ball from inside, so-called outlet pass, and shooting without movement may create optimal conditions for high-percentage shots. Additionally, this result is not surprising considering that most of the time is spent practicing this way of shooting 3-pointers. Dribble shots, while more frequent than stationary catch-and-shots, were less efficient on average, highlighting the challenge of maintaining shooting accuracy when creating one's own shot under pressure.

The data emphasize the importance of incorporating both spatial and contextual awareness into offensive strategy and training. Coaches should design offensive schemes that prioritize ball movement to the wings and leverage inside-out play to facilitate high-efficiency catch-and-shot opportunities. Moreover, since dynamic execution is predominant, training should also simulate game-like movement patterns that lead to 3-point shooting situations.

This study is limited by its sample size (n = 28 games) and its focus solely on high-stakes international competitions. While this enhances the generalizability to elite settings, further research is needed to explore whether similar trends hold in national leagues or youth development contexts. Additionally, a deeper exploration into player-specific shooting tendencies and defensive pressure variables would provide a more holistic understanding of shot efficiency.

CONCLUSION

This study highlights the strategic importance of the 3-point shot in modern elite basketball, confirming its role as a critical factor in game outcomes. Winning teams consistently demonstrated superior 3-point shooting performance—both in terms of volume and efficiency—underscoring its value as a competitive differentiator at the international level.

Key findings revealed that the left and right wings are not only the most frequently used zones for 3-point attempts but also among the most effective. Additionally, the SI_catch-and-shot method emerged as the most efficient execution type, although dynamic execution was more commonly observed in gameplay. These insights emphasize the need for nuanced shooting strategies that combine spatial positioning with execution context.

The results offer valuable guidance for coaches, analysts, and players aiming to optimize 3-point shooting as part of their tactical and training approach. By prioritizing efficient shooting zones and refining execution techniques, teams can enhance their offensive output and increase their likelihood of success in high-level competition.

Future studies should expand on these findings by examining additional contextual factors such as defensive pressure, player roles, and in-game decision-making, thereby deepening our understanding of what makes the 3-point shot such a decisive element in basketball performance.

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Corresponding author:
Radivoj Mandic, PhD
University of Belgrade – Faculty of Sport and Physical Education
11030 Belgrade, Serbia
E-mail: radivoj.mandic@fsfv.bg.ac.rs

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