

COMPARATIVE ANALYSIS OF THE SITUATIONAL EFFICIENCY PARAMETERS OF BASKETBALL PLAYERS IN TWO REGIONAL ABA LEAGUES

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Original research:

Abstract

The parameters of situational efficiency in basketball are interrelated and represent the interaction of technical, tactical, fitness and all other factors relevant to success. By registering and analyzing the parameters of basketball players' situational efficiency, it is possible to arrive at precise values of playing and team efficiency, which provide guidelines for more successful planning and programming of training technology. The aim of the study is to identify differences in situational efficiency parameters between the first and second regional ABA Basketball Basis, based on statistics made up of the individual performance of each basketball player within the team. The study was conducted on a sample of 24 clubs from two ABA leagues, in the regular competition for the 2018/19 season. Variables make the frequencies of successfully and unsuccessfully executed elements of technical and tactical action during the match in the stages of attack and defense. The data was downloaded from the official website www.aba-liga.com and www.druga.aba-liga.com. Nine variables were taken to assess situational efficiency: 1. Average of balls inserted by 2 points (SHUT2P%); 2. Average of balls scored by 3 points (shot 3 P%); 3. Average free throws completed (FT%); 4. Defense Leap (SDEF); 5. Attack Jump (SOFF); 6. Assists (ASS); 7. Obtained balls (STE); 8. Lost Balls (TOURN); 9. Personal fouls (FOUL). Descriptive statistics were used for statistical data processing in order to better describe and understand the data set. The T-test for independent samples established statistical significance in the difference of situational efficiency parameters between the two regional leagues. There is a significant difference in the parameters of situational efficiency between the clubs performing in ABA1 and ABA2 regional league with two parameters, the average of balls inserted by 2 points (sig., 011) at the level of 95% significance, where the clubs from ABA2 regional had a better percentage. Basketball leagues and average personal fouls (sig., 000), where, on average, more offenses were made in the ABA1 regional basketball league. Basketball players in two-regional ABA leagues differ statistically and significantly in 2 parameters of situational efficiency, shot by 2 points and personal mistakes. With all other parameters results exceeded the significance value of 95% ($p < 0.050$).

Key words: basketball, ABA league, situational efficiency

Introduction

Basketball certainly belongs to a group of most popular and the most dynamic sport plays nowadays and it is very interesting for professional and scientific researches in all age groups (Šeparović, Užičanin, Pojskić, 2010). It belongs in a group of polystructural complex sports from the area of kinesiology for which are characteristic cyclic and acyclic types of movement that precede to the basic aim of the game, throwing the ball into a hoop or a goal as well as stopping the opposing player to take the ball and score a goal (Wooden, J.R., 1983; Sindik, Jukić i Adžija, 2012). According to an official FIBA data, today in the

word there are 400 million people actively engaged in basketball, through 213 national federations, and 80 % of this population are young people up to 18 years. For all of these it is obvious that civilization role of basketball during its turbulent historical development has changed therefore it has evolved from completely plain sport game to a precious mean in process of socialization of young people and it has important role in social activities of grassroots. As we monitor the historical development of basketball it is important to emphasize the rules that have significantly affected the development and dynamics and at the same time the improvement of basketball game. There had been conducted analyses, changes and additions to the rules of the game in order to make it more interesting

and to provide the players maximal development of their skills.

With the adequate management of the statistics, and monitoring and noting the events on the basketball game conditions are being made for analyzing the indicator of situational efficiency of the game course as well as the parameters that belong to an area of technical-tactic responsibility. Every basketball game provides great amount of statistical data which are suitable for interpretation. By monitoring, registering and analyzing situational efficiency of the basketball players it is possible to reach required values of individual and team efficiency. Because of the understanding of the course of basketball match it is important to know how to evaluate parameters of situational efficiency. Basketball play and basketball match can be seen as a complex dynamic system represented by two opposite teams. Parameters of situational efficiency in basketball game are interconnected, however following the parameters of situational efficiency while at the same time neglecting the process of interaction in the course of basketball game is incorrect method of explaining the facts. In professional basketball there are "team statistics" where primary goal is to determine characteristics which create winning team. Swalgin (1994.) suggested the system of evaluating players and teams because not all parameters of situational efficiency are equally important for every position in the game. This system was based on three scientific measures which arose from understanding the structure of basketball game:

1. First concept involves common set of parameters of situational efficiency in basketball game which represents standard parameters in "NCAA box score", and they are: the percentage of shooting hoops from the game, the percentage of shooting hoops behind the free throw line, defence jumps and attack jumps, personal fouls, lost balls, assistances, blocked shots and obtained balls.

2. Second concept determines exact measures or standard situational efficiency in basketball game. Considering structural and functional approach to the analysis of basketball game there have been determined the standards for evaluating the result of individual player considering the position and function in the game. The standards have been set up based on a research: "Men's division by college basketball", implemented in the period of three years for positions: first quarterback, second quarterback, small forward, high forward, strong forward and center, and for players with multiple functions in the game (swingmen): first quarterback-second quarterback, second quarterback-small forward, small forward-high strong forward, high strong forward- center. The

assessment of situational efficiency is determined based on comparison of the effects of individual players according to standards for certain positions.

3. Third concept enables the increase of accuracy of evaluation process of the certain player, where has been taken into account the relation of time spent in the game and situational efficiency of that player. Characteristic of individual player have been graded in relation to number of minutes spent in the game. Six out of eight indicators of situational efficiency have been graded in relation to time spent in the game: jumps, personal fouls, assistances, lost balls, blocked shots and obtained balls. When we consider that basketball game is characterized by typical and atypical situations, we come to the problem of objective registration of certain situations in the game. The problem of construction of valid measurement instruments which can help in negative or positive explanation of effect of certain player is resolved by series of statistical techniques. For monitoring purpose of activities in basketball games FIBA (Federation International Basketball Association) standardized thirteen indicators of situational efficiency which are monitored in every official game, based on them it is possible to calculate different derived parameters (Sindik, 2012; Trninić, 1996; Šeparović, Alić-Partić, Užičanin, 2009).

Those parameters of situational efficiency are: number of two-point field goals, number of attempted two point thrown balls, number of three-point field goals, number of attempted three point thrown balls, number of goals behind the free throw line (one, two and three), defence jump, attack jump, assistances, personal mistakes, lost balls, obtained balls, and blocked shots.

It is necessary to emphasize the usage of entered statistical data through formation:

- Culminate statistics (total data for every individual player or a team),
- Individual statistics,
- Team statistics
- Comparing statistics between teams in same or different competition rank and,
- Course of the game that combines all activities during the game in different time intervals.

Expert basketball knowledge which derives from technique, tactic, and game strategy, game experience, leading the games, monitoring the games and knowing the rules provides for the expert monitoring standard

indicators of situational efficiency through rules, techniques and tactics (Trninić, Perica i Dizdar, 2001). In Ljubljana, in 2001. there had been formally organized new regional basketball competition, after which there will be few same competitions all over Europe. The representatives of BC Bosna, BC Budućnost, BC Cibona, and BC Olimpija are establishing Adriatic League and other clubs from Bosnia and Herzegovina, Slovenia and Croatia are joining in. 12 clubs participated in the first season. First winner of ABA league was team Olimpija Ljubljana, which was better than BC Krka Novomesto in the finals. In the next season, the competition joined BC Crvena Zvezda as the first club from Serbia, afterwards Israeli Maccabi Tel Aviv. Maccabi left the league already next season while other clubs from ex-Yugoslavia joined in. From its formation until today the league changed its name several times, so in the beginning it was called Goodyear league (2001.-2006.), after that NLB league (2006.-2011.). The league from 2011. until today is called ABA league. Same as the most basketball teams ABA league is played in two parts. First part of the competition is held in the way that every club plays with each other two times, that is once on the domestic field and once on the guest field. Second part of the competition has changed several times, first three seasons was final-four, after that there was final-eight and in the season 2006/2007 there have been a playoff of two first-ranked teams on the scale. In season 2007./2008 they reintroduced playoff system of four best ranked teams in the scale. A new system was introduced in the 2015/16 season so that the first 4 teams played the playoffs at the end of the regular season, in principle the first against the fourth and the second against the third. The winner is the team that is the first to collect 3 wins. The first two games are played on the field by a team that ranked better, followed by two on the opponent's court. The eventual 5th game, which would be a deciding game, would be played on the better ranked team's field, which was better placed after the regular part of the championship. The highest number of won titles of ABA league has got Partizan from Belgrade, six of them, then comes Crvena Zvezda with three won titles, FMP with two titles won, and Cibona, Zadar, Hemofarm, Olympia, Buducnost and Maccabi with one ABA league title winner. ABA League Super Cup is a basketball club competition which organizes ABA League. It is played as the tournament of the 8 best-placed teams in the previous season. The first competition was played in Bar in 2017. The second ABA league or ABA league 2, is the second level of the ABA regional basketball league. It was founded in July 2017. Currently there are 12 clubs participating in the league. The competition system is a double league, and there were 4 best ranked teams on the table in the final (final four). The

winner of the first edition of the ABA 2 league is BC Krka Novo Mesto from Slovenia. At the moment, clubs from: Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Macedonia and Slovenia are playing in the ABA Regional Basketball League or ABA League 2. Clubs from Bulgaria, Israel, the Czech Republic and Hungary participated in ABA league in previous seasons. It is considered that the indicators of the parameters of situational efficiency in basketball game are determined by the level of success of performing individual, group and collective tasks, which each player should perform according to his position and functional role in the game. Parameters of situational efficiency in basketball are interconnected and they represent interaction between technical, tactical, fitness, and all other factors relevant to success. By registering and analyzing the parameters of basketball players' situational efficiency, it is possible to achieve the precise values of player's and team efficiency, which provide guidelines for more successful planning and programming of training technology. The aim of this research is to determine differences in parameters of situational efficiency between the first and second regional ABA Basketball league, based on statistics made of the individual performance of each basketball player within the team.

Methods

This research is a transversal study, where the theoretical analysis and the notation method identify the indicators of situational efficiency, as well as differences between them, in the basketball teams of two ABA leagues in the regular part of the 2018/19 competitive season.

Sample of respondents

The sample of respondents in this research was comprised of top senior basketball players, clubs competing in two ABA regional basketball leagues for the 2018/19 season. A total of twenty-four (24) clubs that played in the aforementioned leagues have been taken into account and have played (22) rounds (matches) of the regular part of the championship within the ABA1 and ABA2 leagues.

Sample of variables

The sample of variables consists of the frequencies and the number of successfully and unsuccessfully executed elements of technical and tactical activity during a basketball match in the stages of attack and defense. The data was taken from the official websites of www.aba-liga.com and [HOMO SPORTICUS ISSUE 1 2020](http://www.second.aba-</p></div><div data-bbox=)

Table 1 - Descriptive indicators of situational efficiency in the ABA1 league for the 2018/19 season

Variable	N	Extent	Min.	Max.	A.S.	SD	Var.	Skew.	Kur.
SHOT2PABA%	12	10.20	48.20	58.40	52.20	2.78	7.77	.843	.88
SHOT3PABA%	12	11.30	30.50	41.80	33.90	3.11	9.70	1.608	3.11
FT1ABA%	12	15.50	63.00	78.50	72.90	4.05	16.45	-1.117	2.45
SDEF1ABA	12	3.90	20.50	24.40	22.43	1.25	1.56	0.52	-95
SOFF1ABA	12	4.40	8.10	12.50	9.62	1.20	1.46	1.213	1.75
ASS1ABA	12	4.50	15	19.50	17.46	1.36	1.86	-1.44	-35
STE1ABA	12	2.70	5.50	8.20	7.08	.77	.60	-.480	.004
TOURN1ABA	12	3.10	11.60	14.70	13.24	1.16	1.36	-230	-1.74
FOUL1ABA	12	6.70	20.90	27.60	23.85	1.95	3.80	.220	-.22

liga.com. In this study, there were a total of 9 variables for assessing the situational effectiveness of clubs competing within two ABA regional basketball leagues:

1. Average of balls scored by 2 points (Shot2P%)
2. Average of balls scored by 3 points (Shot3P%)
3. Average of successful free throws (FT%)
4. Defense jump (SDEF)
5. Attack Jump (SOFF)
6. Assists (ASS)
7. Obtained balls (STE)
8. Lost balls (TOURN)
9. Personal mistakes (FOUL)

championship, season 2018/19, had average of 2-point shots from SHOT2PABA $52.2\% \pm 2.78$. When we are talking about parameters of situational efficiency which refers to the percentage of successful 3-point shots into the hoop, it would be SHOT3PABA $133.9\% \pm 3.11$. After statistical processing and analyzing it has been concluded that average of successful free throws in regional basketball ABA league is FTABA $72.9\% \pm 4.05$. Analyzing other parameters of situational efficiency which were subject of comparison for this master's thesis it has been concluded that average of jumps in defense at regional basketball ABA league, after regular part of competition is SDEFABA1 22.4 ± 1.25 . On the other side, average of jumps when we talk about average assistance at regional basketball ABA league is ASSABA1 17.4 ± 1.36 . Average of gained balls at regional basketball ABA1 league, after regular part of competition for season 2018/19 was STE1ABA 7.08 ± 77 gained balls. Number of lost balls in clubs at regional basketball ABA1 league, for season 2018/19, after regular part of competition was TOURN1ABA 13.24 ± 1.16 . At the last parameter of situational efficiency, which is a subject of comparison, or average number of fouls during regular part of competition at basketball ABA league for season 2018/19, it has been concluded, that clubs had in average FOUL1ABA 23.8 ± 1.95 fouls. When it comes to the ABA2 Regional Basketball League (Table 2), it is found that the 2-point average shot is SHOT2PABA1 55.15 ± 2.37 for the 2018/19 season. The average of shot successfulness outside the court line is 6,75m, or the average of scored 3-point goals in regional basketball ABA 2 league for season 2018/19 was SHOT3PABA 234.48 ± 2.96 . Analyzing the average throwing efficiency of the 1-point scores, or the average free throw performance in regional basketball ABA League 2, it was found that FTABA2 is 72.08 ± 2.92 . The average number of defenses jumps after the regular competition in the ABA 2 Regional Basketball League, for the 2018/19 season, was SDEF2ABA 22.75 ± 1.74 . After analyzing the statistics relating to the attack jumps of clubs competing in ABA Regional Basketball 2 league, it was found that the average number of jumps in the attack, after a regular part of 22 rounds, for the 2018/19 season is SOFABA2 8.54 ± 1.38 . We can say that assists, along with successful blocks and attack jumps, are factors that produce "easy" points. As for the average number of assists at the club level, within the ABA 2 Regional Basketball League, the regular season was found to be ASSABA2 18.24 ± 1.8 . On average, the number of won balls or gained balls in ABA League 2 for the 2018/19 regular season was STE2ABA $6.92 \pm$, 81 balls obtained, while the average number of balls lost was TOURN2ABA 13.16 ± 1.79 . The average number of fouls or personal

Data processing methods

In this research, statistical data processing was done in SPSS 25.0 for Windows. Descriptive statistics were used to describe and better understand the measured data set. The difference in situational efficiency parameters at the level of the two regional ABA Basketball Basketballs was verified with a T-test for independent samples (Čolakhodžić and Rađo, 2011). The results are presented in tables.

Results with discussion

Accordingly, the research was conducted on the base of analysis of the matches of clubs competing in two ABA regional basketball leagues, a total of 22 rounds of the regular part of the competition. The formation of the database shows the parameters of situational efficiency that condition the result and success of the clubs in the competitive season 2018/19. Analyzing the statistical data (Table 1) has been determined that clubs which competed at regional basketball ABA1 league, after 22 played rounds of regular part of

mistakes committed in ABA League 2 during the regular part of the competition was FOUL2ABA 20.7 ± 99.

Table 2 - Descriptive indicators of situational efficiency in the ABA 2 league for the 2018/19 season

Variable	N	Extent	Min.	Max	A.S.	SD	Var.	Skew.	Kur.
SHOT2PABA	12	7.30	51.90	59.20	55.15	2.37	5.643	.293	-977
SHOT3PABA	12	9.80	30.80	40.60	34.48	2.96	8.814	.617	.241
FT2ABA	12	10.10	67.90	78.00	72.08	2.92	8.529	.481	.022
SDEF2ABA	12	5.80	20.20	26.00	22.75	1.74	3.050	.234	-761
SOFF2ABA	12	5.40	5.50	10.90	8.54	1.38	1.921	-.677	1.408
ASS2ABA	12	7.00	16.00	23.00	18.24	1.80	3.263	1.593	4.278
STE2ABA	12	3.00	5.40	8.40	6.92	.81	.662	0.59	.151
TOURN2ABA	12	5.40	10.70	16.10	13.16	1.79	3.219	.278	-1.24
FOUL2ABA	12	4.20	18.50	22.70	20.76	.99	.988	-.592	2.720

Differences in the arithmetic mean of the situational efficiency parameters were determined on the basis of the T-test for independent samples (Table 3). The analysis of the results shows that for two parameters of situational efficiency: 2 points shots (ŠUT2PABA) and the average number of personal mistakes made by clubs, or their players (FOULABA), there is statistical significance in the difference of arithmetic means.

While for the six parameters of situational efficiency the significance exceeds the value of statistical significance, that is, $p < .050$. For one parameter, SOFABA (jump in attack), significance was at the limit of statistical significance ($p < .053$). In ABA League 2, the 2 points shots were 55.15% of the ABA League 2 scoring average, while in the higher ABA1 League rankings it was 52.2%. On the basis of the analysis of differences in the arithmetic means performed by the t-test for independent samples, it was concluded that there is a statistically significant difference in the parameter of situational efficiency, which refers to the average of two-point balls thrown into the basket. We can certainly look for reasons in terms of defensive intensity, selective shot and shooting range. After analyzing the average number of personal mistakes made by clubs, or their players, it was concluded that in the regional ABA Basketball League we have a higher average of personal mistakes made. It is FOULABA1 23.8 average personal mistakes made. In ABA Regional Basketball league 2, the average personal foul rate is FOULABA2 20.7. On the basis of the t-test for independent samples, this parameter of situational efficiency established statistical significance at the level (sig.000). By means of the t-test for independent samples, it was determined that there was no statistically significant difference between the two

regional basketball leagues. The following parameters: 3-point average throwing success (SHUT3PABA); free throws (FTABA); catching a deflected ball in defense, or defensive jump (SDEFABA); total assists within the ABA League (ASSABA); average of gained or won balls in the regional basketball ABA leagues (STEALABA) and average lost balls (TOURNABA).

Table 3 - Differences in the arithmetic mean of situational efficiency parameters between two regional ABA Basketball leagues

Variable	F	p	t	df	p	T-test for Equality of Means			
						Mean Diff.	Std. Err. Diff.	95% CI Lower Upper	
SHOT2PABA	.112	.741	-2.78	22	.011	-2.94	1.05	-5.13	-74
SHOT3PABA	.012	.914	-.463	22	.648	-.57	1.24	-3.15	2.00
SHOT1PABA	.550	.466	.572	22	.573	.82	1.44	-2.16	3.81
SDEFABA	1.98	.173	-.511	22	.615	-.31	.62	-1.60	.96
SOFFABA	.044	.835	2.04	22	.063	1.08	.53	-.01	2.18
ASSABA	.133	.719	-1.18	22	.248	-.77	.65	-2.13	.58
STEALABA	.019	.893	.488	22	.631	.15	.32	-.51	.83
TOURNABA	2.94	.100	.121	22	.905	.07	.61	-1.20	1.35
FOULABA	5.35	.030	4.89	22	.000	3.09	.63	1.78	4.40

Conclusion

Regional ABA Basketball leagues have been relatively unexplored so far, especially considering this is only the second edition of ABA Regional Basketball league. The aim of the study was to determine the difference in individual situational efficiency parameters at the level of two regional ABA Basketball leagues, all of which based on team statistics of the parameters of situational efficiency, which is actually a set of different contributions to the game of each basketball player. The comparison of situational efficiency parameters relates to the regular part of the regional basketball ABA league championships for the 2018/19 season. The descriptive statistics and t-test for independent samples determine the difference in situational efficiency parameters between basketball clubs competing in regional basketball leagues. After comparing the data with the t-test for independent samples, a statistically significant difference in the

parameters of situational efficiency between clubs playing in the ABA1 Regional Basketball League and ABA2 Regional Basketball League is present when talking about the following parameters:

- Average of two-point balls scored - where clubs performing in the ABA2 Regional Basketball League had a better percentage.

- Average of personal errors - where, on average, more offenses were made in the ABA Regional Basketball League, or in the higher rank of regional basketball competition.

Only with 2 situational efficiency parameters is there a statistically significant difference between clubs playing in ABA regional basketball leagues. For all other parameters, the significance exceeds the significance value $p < 0.050$. We can conclude that the teams in ABA1 and ABA2 league are not statistically significantly different in most of the treated situational parameters and that although these are two levels of regional competitions, the quality of the teams is the same. The reasons for differences in individual parameters of two ranks of competition, we can look for in relation to the defensive intensity of teams of each rank, selective shot and individual shot rank of basketball players of each rank.

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